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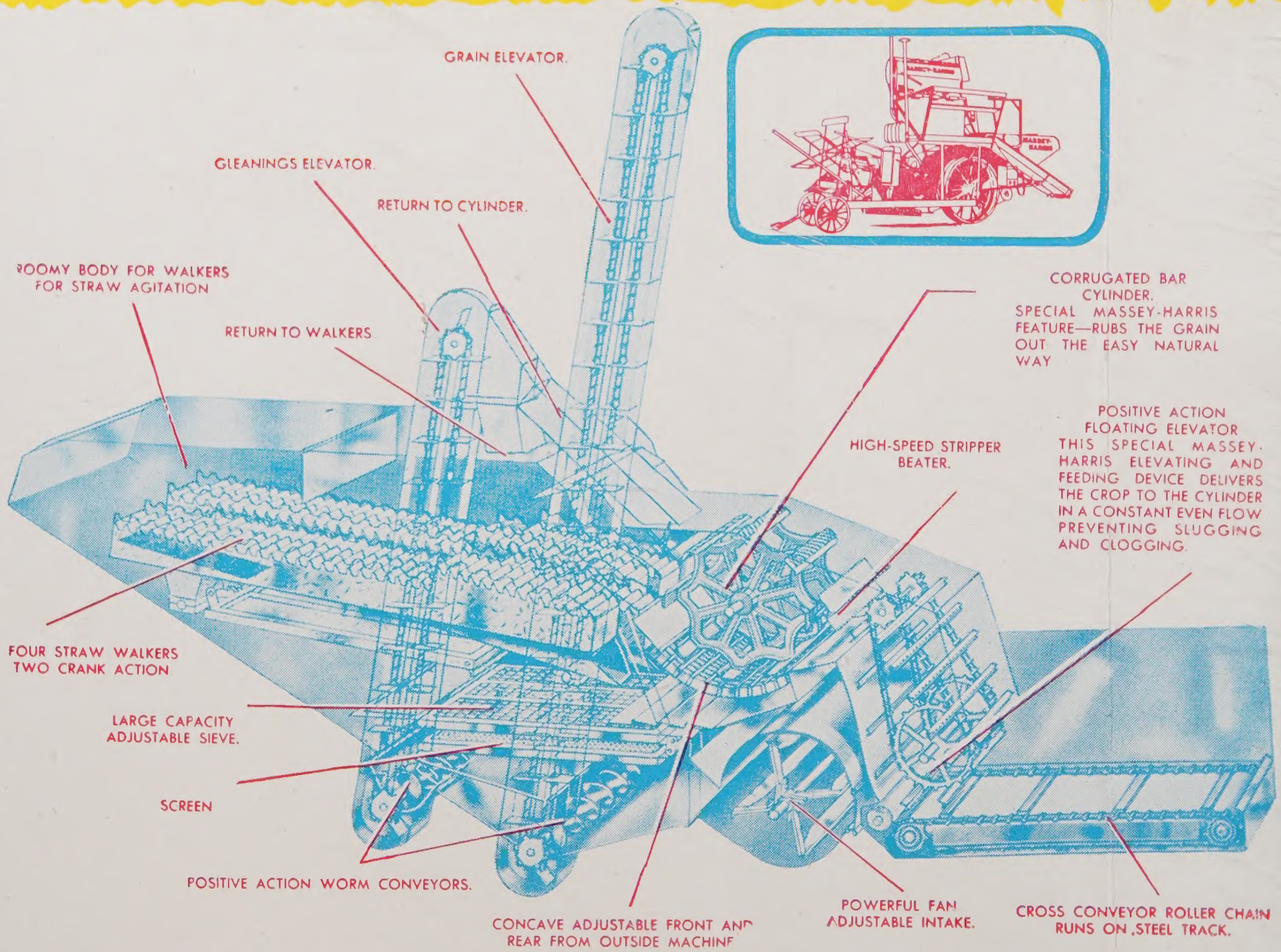
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New Zealand
JOURNAL OF AGRICULTURE

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Agricultural Education and Advisory Work in Britain

ALTHOUGH the first and most urgent wartime agricultural need in Britain on the outbreak of war was to increase the volume of production from the land, it soon became evident that considerable expansion of agricultural education and advisory work was also required. The author of this article, G. A. Holmes, who was one of the Dominion agriculturists loaned to Great Britain during the war, describes how this expansion was achieved, and compares the activities of the National Advisory Service in Britain with agricultural educational work in New Zealand.

IN the early years of the war the most urgent necessity was to increase the volume of production from the land, and to do this regardless of the possible disinclination of many land owners and occupiers to incur the expense and risk of cultivating land which was suffering from many years of neglect. It was necessary to provide subsidies for breaking up old grass and for growing wheat or potatoes to meet the many cases where the farmer's finance did not permit him to shoulder the burden unassisted. The ploughing-up policy was highly successful, resulting in nearly 7,000,000 acres of additional cultivation by the fourth year of the war.

Pre-war Apathy

It was soon realised that side by side with the effort to increase the physical volume of production, there would be required a very much wider development of agricultural education and advisory work. In pre-war years this had been for the most part organised on a county basis under the Education Committee of each County Council. The work was hampered often by lack of finance, a lack of interest in some counties, especially those where manufacturing was considered of greater importance than agriculture, and by the fact that there was no concerted national policy directing the work. Farming itself had been on a declining basis over a lengthy period, and it could not be expected that education would serve to offset difficulties which were due to economic and political causes. For all that, each Agricultural Organiser had built up a wonderful knowledge of his particular county, an accumulation of local knowledge which became of incalculable value to the Food Production Campaign during wartime.

National Service Created

On the outbreak of war the County Organisers were immediately appointed to executive positions with the County War Agricultural Committees, and on them fell a great deal of the responsibility both for the technical and administrative work of these committees. Since 1942, they have been assisted on the technical side by additional officers appointed and paid by the Ministry of Agriculture, and working under the direction of a special Technical Development Committee. More recently it has been approved that all advisory work to farmers should be directed by the National Advisory Service, a special branch of the Ministry.

The forms of educational and advisory work follow principally lines which are, or have been, familiar in New Zealand, although on account of the very large number of farmers in each county, individual advice on the farm is less a feature of the work than it is in the Dominion. This is recognised as a weakness, and no doubt steps will be taken after the war to increase the staff and to provide a better service. Work during wartime consisted principally of evening lectures and field and market demonstrations. Lectures were usually to meetings convened by the National Farmers' Union (county branch) or the Young Farmers' Club. In addition there were periodic conferences which might be attended by men particularly interested in some special subject, for example operation of the header harvester, seed growing, or crop drying. Field demonstrations were often organised for a Sunday afternoon or a summer evening so as to interfere with farm work as little as possible and yet to secure a good attendance of neighbouring farmers. One of the most popular forms of demonstration was a walk round one of the best-managed farms, with short talks in each field by the farmer himself, or by one of the technical officers. Young Farmers' Clubs took most interest in livestock demonstrations and judging competitions, while they could always be relied upon to turn out in force to any lecture accompanied by lantern slides or moving pictures. Unlike the New Zealand clubs, the British ones admit both girls and boys to membership, and in some counties have junior sections which meet at the schools after school hours.

Demonstration Vans

In some counties the Technical Development Committees have demonstration vans which attend at the markets in the various market towns throughout the county. The vans are equipped with folding benches for the setting up of exhibits and carry also posters and a supply of educational leaflets. This form of agricultural education was perhaps more necessary in wartime than it would be in peacetime, on account of the necessity for a considerable amount of propaganda aimed at keeping the farming community alive to the necessity for extra production, for economy in tractor fuel, and for improvement of pastures and livestock. The demonstration van really served much the same purpose as a show exhibit; it was a method of teaching farmers **about** the things which they were handling, and was not expected to teach them what to do under the particular conditions on any individual farm.

Livestock demonstration at a farm homestead in Wiltshire.

It is only quite recently that efforts have been made to give an agricultural bias to the teaching in country schools in England. The criticism has always been that the whole of the teaching tended to encourage country children to look for opportunities in industry, the professions, or clerical work. There are still only one or two teachers' training colleges which give instruction in agriculture to students, and very few schools which have facilities even for elementary work in nature study or school gardening.

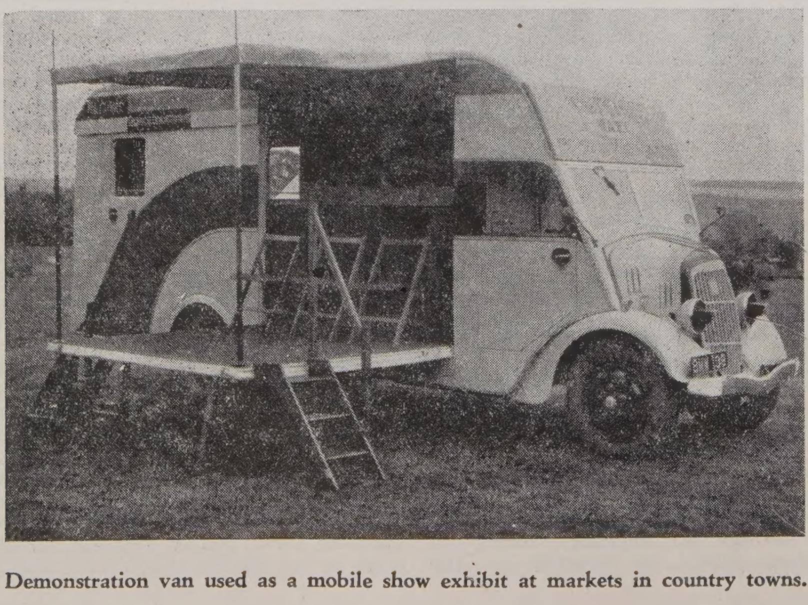
Farm Institutes

Up to the present less than half of the counties of England and Wales have formed institutes, but those that were established in pre-war years have done exceptionally useful work both in teaching the arts of farming and something of the science underlying farming practice. In many cases the institute buildings were commandeered at the outbreak of war as training centres for Air Force or Army personnel, and the ordinary teaching work was interrupted. Under the new Education Act it is intended to establish a farm institute in each county and to make it a centre for the training of young people who intend to take up practical farming.

Colleges

There are three agricultural colleges in Scotland and seven in England, but in addition to these many of the university colleges maintain an agricultural department, giving a course of lectures and practical work leading to a degree or diploma in agriculture. Some of the colleges in addition give a course of two or three terms intended for those engaged in farming. Those who qualify at the conclusion of these courses are granted a certificate in agriculture. The work of the colleges was considerably dislocated by the war, and their work became more of a research nature than purely teaching. It is expected that many young people from the Services will wish to train in agricultural science, and that for some years the colleges will be filled to capacity. There seems no lack of opportunity for graduates in agriculture in connection with farming advisory work or other form of agricultural education in Great Britain.

The long-term view is that the pronounced drift from the land, particularly between the two wars, can be countered only by providing attractive educational facilities in country districts. Before the war, for example, it was quite usual for large manufacturing firms to offer free technical training to apprentices, who were also paid wages during their apprenticeship years. There has been nothing comparable with this in farming, and therefore it is not surprising that young people drifted into the towns. It is felt, too, that the efficiency of the average farmer could be considerably improved if he took advantage of expert advice on new methods of farming. The general experience is that it is the educated farmer who is most ready to change with the changing times, to appreciate the advantage of new methods, and to apply them intelligently to his own particular circumstances.


Demonstration van used as a mobile show exhibit at markets in country towns.

Training a Sheep Dog

YOUNG farmers, shepherds, and drovers about to start the training of a puppy for stock work will find invaluable suggestions in this article by E. G. Broad. The author describes the training of dogs for particular types of work, and stresses the importance of the trainer imposing discipline on both himself and the pupil. The adoption of the methods he recommends for developing a farm dog would do much towards retaining the high standard set in New Zealand among sheep dog men.

THE art of getting the very best out of a sheep dog by training is given to few. Nevertheless, the sheep dog is essential on a farm, and while many cannot hope to become very expert trainers, practically all farmers are called upon to attempt the training of a dog at some time or another, and if at the outset they can grasp the fact that a sheep dog puppy is trained somewhat on the lines that a child is educated at school, by easy stages, then he ought to be able, with guidance, to make a very useful helpmate of an intelligent puppy.

One's efforts will only be disappointing unless one is working on good material. The first essential is the selection of a good pup, born of parents both of whom are good workers and whose ancestors were noted for their working ability. A well-bred pup has natural instincts which make his training much more easy, pleasurable, and certain, whereas a puppy of nondescript breeding may be just a source of continual worry and disappointment. In spite of all care in the selection, however, it will be found that the temperament and intelligence will vary even in pups of the same litter.

A trainer, to be successful, must have great patience and determination, and be able to control his temper at all times and be prepared to devote some time to the training. Absolute control at all times, not only of the pupil but by the trainer himself, is essential. To attempt to educate the pup by thrashing, due to loss of temper on the part of the trainer, will simply instill fear into the pup and destroy at one stroke any natural ability to learn that the pup may have had. Too many expect a pup to train himself simply by chasing sheep, and too often farmers say that they have not the time to give to a pup. A badly-trained dog wastes no end of time during his lifetime.

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Left—Teaching commands at two to three months old. Right—The puppy learns not to be afraid of a stick and yet to obey orders.

Answering to Name

As the puppy grows his elementary training should proceed, and as soon as he can toddle round he should be taught to answer to his name. He will soon learn to do this if every time he is fed he is called by name or whistle. The name or whistle commands used do not matter so long as they are adhered to throughout his training. Care should be taken in his early life always to reward him when he answers and he will soon learn to obey.

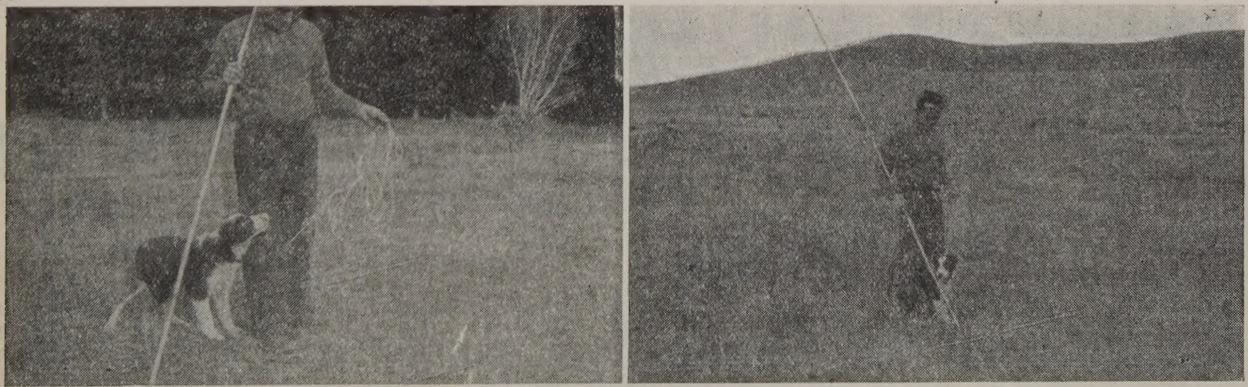
While he is growing the pup should not be kept on the chain more than is absolutely necessary. Like a little child he loves company and frets when alone. If not allowed to romp and play, he will grow up a surly youngster, showing little of the happy nature all pups should possess. Of course he will get into mischief, but while trying to correct him it is far better to remove the fowls, ducks, or cats out of his reach, if possible, rather than punish him for playing with them. The time will come when he may have to have a little sterner handling and be kept more on the chain, but this should be delayed as long as possible.

Commands

The pup should next be taught to sit down, but he should not be frightened into doing this by threatening him with a stick. For a start he should be just pressed down gently with the hands, bearing in mind that nearly all lessons are better taught by kindness, and using plenty of patience rather than plenty of stick. Later, when he is old enough to know better, he must not be allowed to disobey. As he begins to understand what is required of him when commanded to "sit down," teach him to remain "sitting" while you move away from him, and gradually increase the distance as you are satisfied that he understands what is required of him. These little lessons, good healthy food, and a snug kennel will be all that he will require for the first three or four months of his life, when he should be proficient enough to pass on to more advanced work. (Note:—The pup may be taught to "stand" or "lie down" if preferred to "sitting." In fact, in expert hands it is quite common to see a dog understand the attitude to adopt in obedience to all three commands).

The next lessons are to lead nicely on a cord at heel, then to move right or left, forward or backwards, on command. To teach him these lessons the cord is kept on him, not very long to start with, but lengthening as he becomes proficient. The cord may be 6ft. long to start with, tied to his collar one end, and the other end tied to the end of a walking-stick. With this attachment, on commanding him to "sit down," hold the stick at arm's length, first to the right and then to the left. Moving in the direction to which the stick is pointing, command him to "Come out here, Jock," and he must, if he will answer to the pull of the cord, move out with you. This, of course, applies to right or left. To bring forward you gently pull forward, using a different command, such as "Walk up, Jock." To go backwards, push backwards, using still another command, such as "Get back, Jock."

Whatever command is used, whether by word or whistle, take care to use that same command always, keeping in mind that a puppy works by habit and answers to commands through habit. If he gets into the habit of answering commands in a



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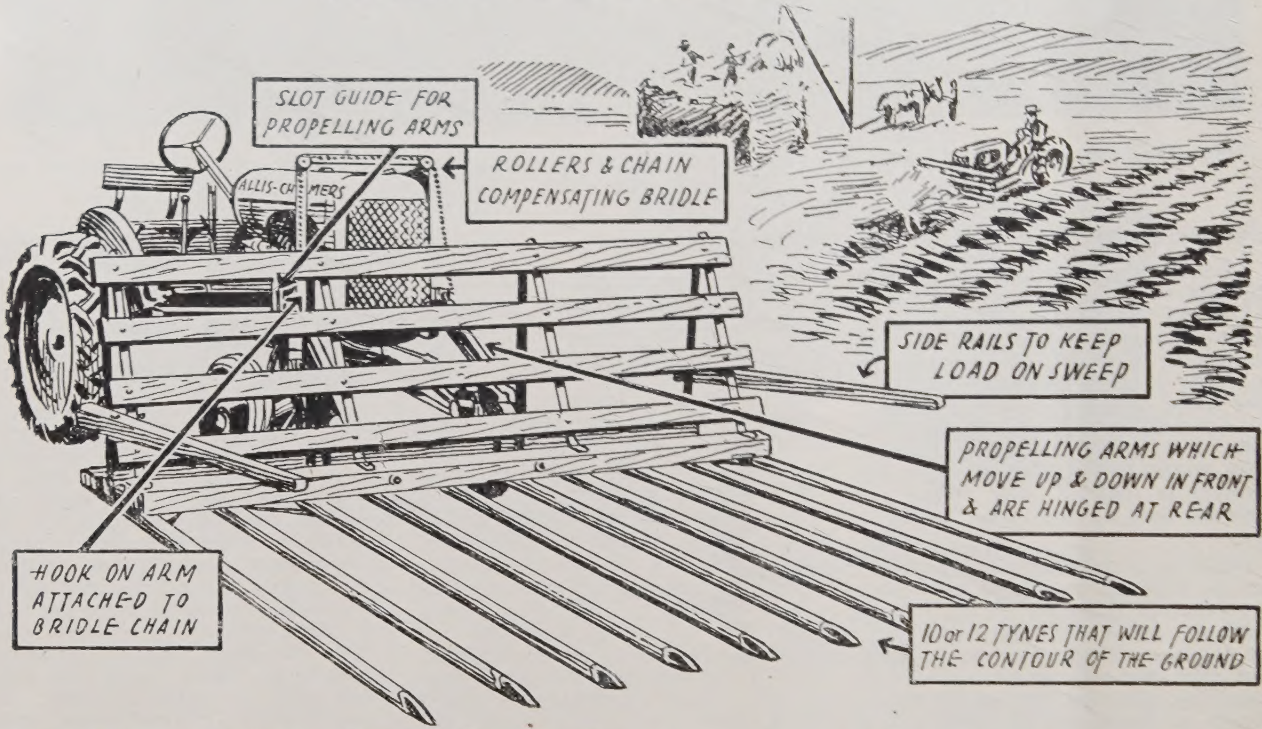
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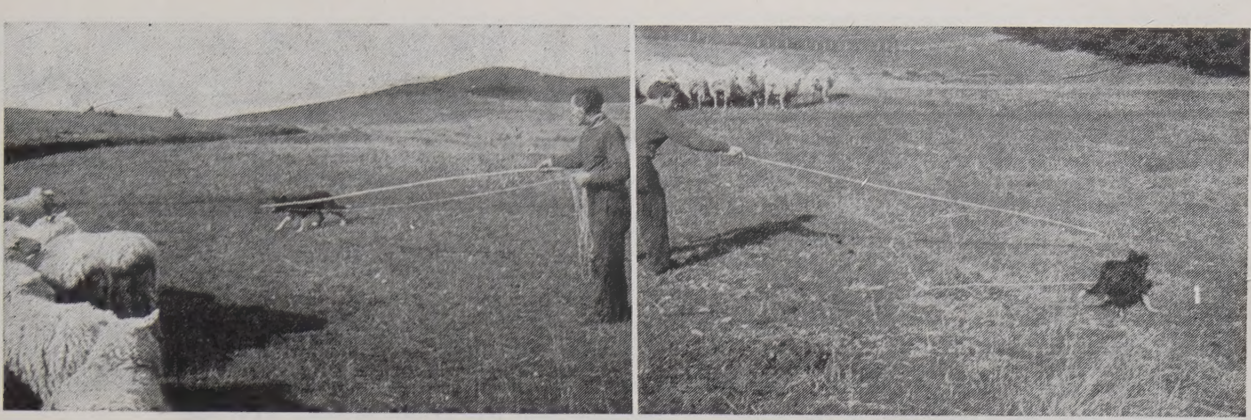


Left—Prevent "cutting in" too close with young dog. Right—"Keep out" wide from heel.

slovenly manner, he will never do his turns properly, but if you insist on the lessons being done smartly from the first, he will get into the habit of obeying promptly and correctly.

There may be days when neither you nor the pup seems inclined for lessons. You may not be feeling quite fit, and the puppy may seem particularly dense or obstinate and everything seems wrong; in that case give lessons a spell for a day or two. Carry on a little each day if possible, until the puppy knows exactly what is required of him by the different commands, lengthening the cord as he becomes more proficient. Repeat the lessons all over again without the cord tied to the stick, but with one end within easy reach, and finally without the cord at all, but do not be in too great a hurry to do this. The trainer must be guided by the temperament of the pup as to how fast he can proceed with the training and also to some extent the method to adopt.

The Check Cord

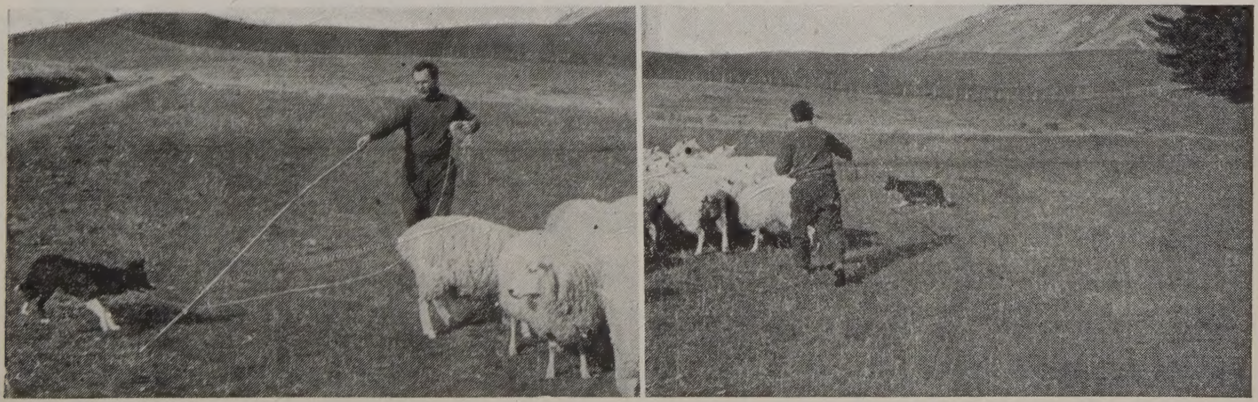
Care has to be exercised in the use of the check cord. It must be looked upon, and used, as a means of preventing escape rather than a means of dragging the dog about. Endeavour must be made to keep the dog in a cheerful frame of mind while the check cord is on him. Tit-bits by way of reward when commands are obeyed will assist to do this. Any injudicious use of the cord will only make the pup frightened and sulky. Its use should not be continued longer than is absolutely necessary to teach him what you require him to learn; but do not hesitate, at any time, to put the cord on him if he appears to require a little stern reminder to obey instantly.

Up to this time the puppy has not been asked to do anything with sheep; neither is it advisable to attempt to work sheep with him until he has been thoroughly grounded in the elementary lessons as set out above. Having him so far educated, it will be found that, with his own natural instincts, he will be ready to go right ahead with his first lessons on sheep. At about this stage it must be decided for what class of work it is desired to train the puppy. Those who breed pups should know from the breeding for what class of work the puppy is most suitable, whether straight-out "heading," "leading," "huntaway," or perhaps all-round work.

Heading

The natural instincts of a young "header" may help him to make a very promising "shape" when first introduced to sheep. If that is so, all that is necessary is to control him and endeavour to encourage him to do his moves correctly, but his education must proceed step by step, and on no account must he be permitted to attempt difficult turns.

The chief thing to bear in mind always is to check at once any undesirable habits that may have a tendency to develop. It is worth repeating that some puppies are more easily taught than others, and one must be guided by the pupil's intelligence as to how fast to proceed with the training. Generally from six to eight months is early enough to start the pup on sheep, but much depends on the class of work for which one proposes to train the pup. If it is for straight-out "heading," he must be old enough to have developed a fair turn of speed before being asked to handle sheep, while a "huntaway" pup may be ready to start on sheep earlier.



Left—"Keep off" near at hand. Right—Prevent stopping on wing.

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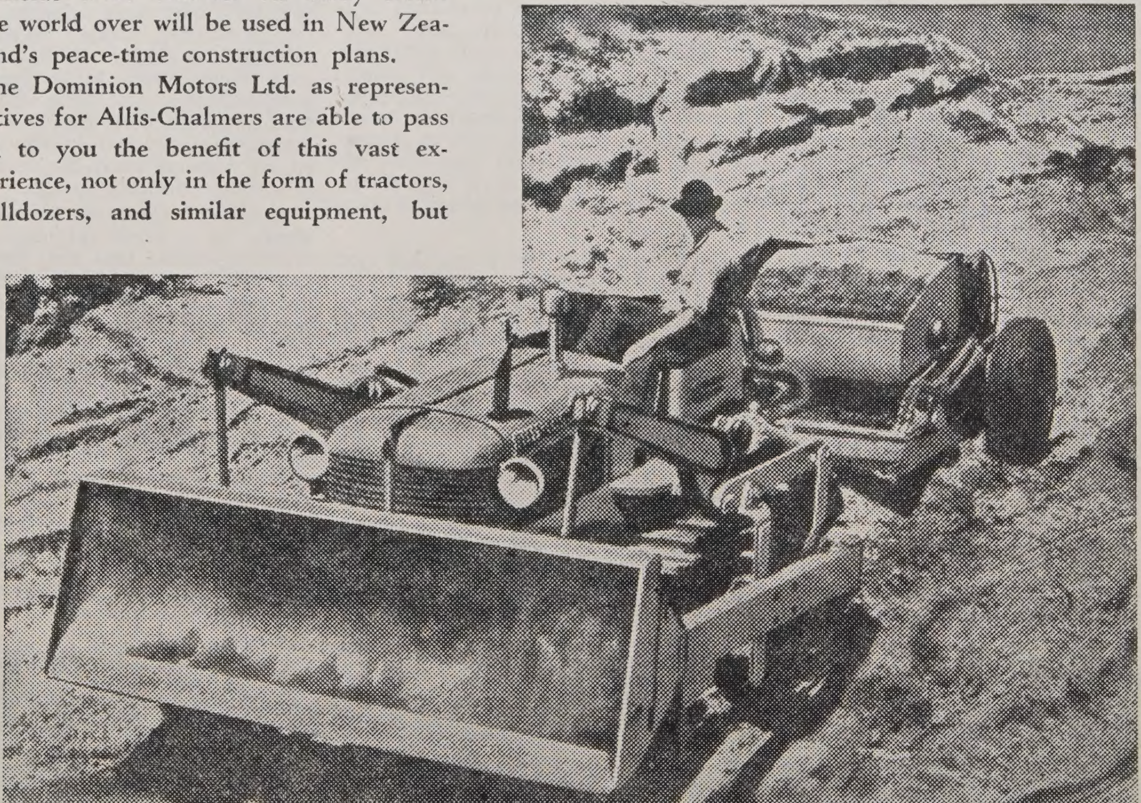

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Left—"Clapping." Right—"Strong-eyed" dog.

At this stage it may be well to repeat some very important matters in connection with the training of the puppy. Strict obedience to commands is the chief essential to good training, and if one is unable to attain this, there is something wrong. It should not be necessary to repeat a command, and it is a bad practice to do so. Therefore, strict obedience (without sneaking a few yards after the command is given to stop) must at all times be insisted upon. If the pup's early training has not been thorough, he will never make a first-class sheep dog.

If one of the slower sort is being handled, too much must not be expected too soon. Over-instruction or any attempt to force the pace will result in failure.

Another very important point, too, is to make the sound of command suit the distance; if a dog is working close at hand commands should be given in a quiet tone, and the volume increased according to the distance out. The commands should be short and distinct, and all training given by only one person.

All lessons must be taken seriously both by the trainer and pupil. The puppy must not be allowed to jump about and become over excited. Endeavour to keep him in a happy frame of mind throughout the training. Most dogs delight in work, and can show their desire to do what they are commanded if they can be taught clearly to understand their master's desires. The objects of training, as it is proceeded with, are to strengthen the weaknesses in a dog's work, and a determination to eradicate bad faults, or rather to check at once any bad faults as they appear.

These instructions to the trainer are inadequate without the practical experience of the nature of sheep that the really successful trainer must have. Knowledge of the nature of sheep is most essential. On the "heading" trial ground, for example, sheep are often brought down the hill, a distance of 600 yards or more, in 3 minutes, which works out at 7 miles per hour, or 56 miles in 8 hours. It should be perfectly obvious to anyone that sheep cannot stand this pace for long. When mustering weak sheep an experienced shepherd knows the warning signs of sheep about to "knock up," and knows he must not attempt to bustle or dog sheep at this stage; he keeps his dog off and allows the sheep to draw along at their own pace, which they invariably will do if left alone.

The dog used in the lambing paddock must also have had a thorough grounding in the elementary stages of his education if he is to be of any help at all. It is not likely that one is going to have much success in mothering a weakly lamb to a nervous mother with a dog sticking close to one's heel. He must be ordered to keep well away and remain "down" until ordered to move, and when not otherwise employed must keep close at heel and not roam through the ewes looking for tucker. The moral is never to take a hungry dog into the lambing paddock.

If a really brainy pup is being trained it will soon be noticed how soon he seems to anticipate the movements of his sheep, and will most likely be in the right position to check without commands any faulty moves on the part of the sheep. A well-bred pup in training appears instinctively to comprehend the desires and wishes of his master. If the trainer does not understand the nature of sheep, and the pupil is not particularly brilliant, the result will be much unnecessary running both on the part of the dog and the sheep, thus defeating the objects of training, which

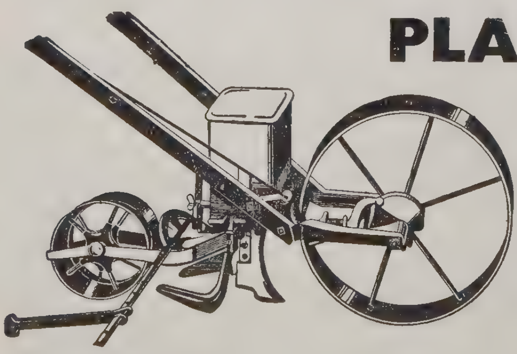
"Huntaway" barking "head on" to sheep.

are to teach the dog to handle sheep in a careful manner and not unduly race them about.

Introduction to Sheep

The introduction of a puppy to sheep should be done in a secure paddock where the sheep can be easily controlled. A few tractable sheep up against a fence is preferable, with an old dog at hand to take control if necessary. A puppy may make a natural cast—he may run out with a wide sweep round his sheep—at once, in which case the trainer may well be pleased, since it is now necessary only to stop him and stand him on the head, or, to be more correct, stop him at a point where he has control, or at what is known as the point of balance. On the other hand, the puppy may not be so keen, and it may be necessary to coax him to take an interest in sheep, in which case he should be allowed to watch an old dog doing the job. If necessary, he should be allowed to run with the old dog until he becomes interested, but care should be taken in doing so not to let the pup develop the habit of running with another dog.

Very much will depend on the way the puppy makes his first shape on sheep. If he is a natural "heading" dog, he may make a very nice cast around his sheep, and if a strong-eyed, natural "clapping" dog, he will stop and "clap," or stand naturally, without a command to do so. A natural strong-eyed "clapping" dog is one that approaches his sheep in a crouching manner similar to a cat stalking a mouse. A dog of this nature often goes right down on his belly when commanded to stop, with his nose right down on the ground, between his forepaws. On the other hand he may not make a very promising first shape. He may run practically straight at his sheep; he may be rash and excitable, in which case it will be necessary to use some patience, first to get him to understand that he must make a sufficiently wide cast round his sheep, and second that he must work them steadily. To do this, go round the sheep once or twice with him on the cord and endeavour to get him eager to head, keeping him out from his sheep as he runs out, with a cord attached to the end of a stick, as described earlier. Should he be rash and excitable and inclined to "dive in," he must be sternly controlled, and frequently commanded to "stand" or "sit" until he has calmed down. Never check him on the run-out, unless absolutely necessary. He should be encouraged to get to the head quickly. If the pupil is of good parentage and not over inclined to be contrary, all that will be necessary will be to see that conditions are favourable for his first run, and that the sheep are suitable for a young dog to work. The pup should be commanded to remain stationary a minute or two before being asked to "come on" his sheep, providing, of course, conditions are favourable. By allowing the dog to pull (bring towards you) a short distance, the trainer will notice the dog's natural style, and if he is inclined to "over-run" (that is, to run round on the wing, or too far each side) too much, he must be checked. A good way to do so is to allow him to pull the sheep with the trainer walking on the lead and commanding the dog to "keep back" each time he tends to come round too far. A perfect pulling dog comes straight on behind his sheep, anticipating movements and correcting any deviations from the straight line of pull, unless of course, commanded otherwise.



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BRANCHES: Wellington, Christchurch, Gisborne, Greymouth, Whangarei.

Having the dog now "casting out," "heading," "lifting," and "pulling" correctly, it now only remains to extend the distances. The moment any unsatisfactory work is detected the work should be brought closer to hand where the trainer is in a better position to correct the errors. As the dog gains experience in "heading" and "pulling" he may be sent out after sheep in more difficult country. He can be sent out after sheep that are out of sight, but for a start great care should be taken that his sheep will be easily seen as he gets on the high ground, and that there are no difficulties in the line of pull. Never intentionally send a young dog out of sight where he may fail to find sheep.

Leading

It may be desirable to train a dog to "lead," and almost any "heading" dog can be so trained, though some do seem to have a more natural aptitude for the work than others. The main thing to remember in training a dog to "lead," is that he must be taught all the other "heading" turns first; especially must he be taught to obey the command to "come on," whether by word or whistle. A "leader" that will not obey this command is simply a "run-ahead" dog, and the faster the sheep travel the faster he will go, until he becomes useless. A dog may be started "leading" by getting a few sheep, preferably in a fenced-in lane, getting the dog on ahead, the trainer keeping in a position where he can make the dog give way as the sheep advance on him; when once the dog has the idea the distance and the size of the mob can be increased. As in other classes of work a "leader" should not be allowed to "skite about," but should allow just sufficient elbow room for the sheep to draw along quietly at a pace suitable to the tail end of the mob.

Huntaway

The method of training the huntaway is very much the same as with the "heading" dog up to the time he is ready to handle sheep, with the exception that the "huntaway" can start working sheep earlier than a "heading" pup if he is sufficiently advanced in his early education, and that whereas the "heading" dog takes most of his commands "head on" to his master, the "huntaway" takes, or should take, most of his "tail on." The trainer should therefore endeavour to get his dog to answer commands without turning head on, or, in other words, a "huntaway" dog should take his commands while still keeping his eyes on his sheep. In order to attain this, a "huntaway" should never be commanded while he is "tail on" to sheep; the trainer must wait till the dog's eyes are on his sheep before doing so.

As with the "heading" dog, his first tasks on sheep should be simple, and preferably in a lane securely fenced, with a sufficient number of sheep to cover the width. Start these sheep moving by asking the dog to "speak up," advancing with him if necessary. When on the move slacken your pace and endeavour to get the dog between you and the sheep, and let him carry on while you are slipping back meanwhile, thus increasing the distance gradually between you and your dog. The "huntaway" dog should be naturally noisy, one that barks with delight and not one that you have to pump the noise out of. He should bark only to force sheep from him or when otherwise commanded to do so. Excessive noise is not only unnecessary but exhausting, while the sheep soon become accustomed to continual barking and take no heed of it.

When the dog is hunting satisfactorily along the lane he can be asked to hunt sheep along a fence line —not too steep to start with, so that the sheep will draw up freely without much "punching." As he becomes more proficient a steeper fence line can be selected, and later again he can be asked to hunt out in the open. This will necessitate his putting in some "slews"; he will have to move both right and left in order to hunt them in the desired direction. He should come out freely when asked to do so, stand his ground and approach from that angle in a bold manner head on to his sheep, plus some noise delivered freely with "punch" or weight in it. This method of approach, when properly executed, is in marked contrast to the natural swinging style of the untrained dog.

All-round Dog

There is still another class of work known as "all-round work," and a dog that can be trained to do anything in the way of "heading," "leading," and "hunting" is undoubtedly the most useful dog for anyone having only a limited amount of stock work to do, and when it is necessary to keep only one dog. As a rule a dog of this sort does not become very expert at any particular work. He may be termed a jack-of-all-trades and master of none; nevertheless he is often called upon to do more work than any other, whether as one of a team or alone. His education is proceeded with on the same lines as the "header," "leader," and "huntaway," but an endeavour must be made to keep his work balanced and to find a good variety of work for him, and not a lot more "heading" than "hunting," or vica versa.

In the foregoing advice it has been assumed that the training is being carried out with sheep, but it should be understood that a dog can be trained on any class of stock in the same manner as on sheep. In fact there is no better way of training a huntaway pup than to let him slowly move the cows in and out to the milking shed, along the race or lane so common nowadays on many dairy farms.

The importance of teaching the early or elementary lessons thoroughly cannot be over-stressed. These may be likened to a good and solid foundation on which the degree of excellence of all future training depends. Many difficulties may arise not touched upon in these notes, but the chief will mostly arise from bad characteristics of the dog, such as vicious biting, sulkiness, excitability, or wilful disobedience. Characteristics such as those must be bred out of a strain before they are worth the trouble of trying to break in.

No mention has been made of any special training for trial work, because a well-trained dog, broken in and used on all classes of country, should be an ideal dog for trial work, though there are some who affirm that special training by some secret method is required. The author knows of no secret methods; a certain amount of specialised schooling over a trial course may be beneficial, but can be overdone.

Without attempting to explain all the different faults that may have a tendency to develop, or the difficulties that may arise in the course of training, a hint or two as to how to attain "firmness" in a dog may be helpful. Firmness is acquired during the course of training as the dog gains confidence in his work. To instill confidence great care must be taken with the young dog to see that when asked to "come on" it is safe for him to do so by making sure that the sheep he is working can and will move off him as he approaches. Later he can be tried on stiffer sheep, say along a fence line, with a firm dog to "walk up" with him; then later again, without the second dog, but with the trainer very handy to assist, if necessary, to back the sheep and prevent immediately any attempt on the part of the sheep to charge the dog. If a bold sheep is allowed to charge a young dog a few times, he develops into what is known as a "back-caster" or "tail-turner"; he becomes frightened to approach sheep and gives ground rather than stand firm. There are other methods, but they are not for the novice to attempt and need not be mentioned here. The above method, although it is slow and requires some patience, is the only safe way. In any case this is a finer point, and if the young trainer desires to perfect these points he should study an experienced shepherd handling his dogs, when he can pick up far more readily the right methods to adopt. The young trainer must not be afraid to ask questions of these men, who are always ready to assist the novice.

There has been some criticism of the use that can be made of the stick, but the writer considers directions so given are distinct and more readily understood, and if the early lessons as set out in these notes are taught with the pup on the cord as suggested, he learns to move in the direction the stick is pointing. Further, like the spurs to a horse the stick can be an urge to greater effort, but seldom can it be used to advantage as a means of severe chastisement. A young trainer should firstly understand that a dog, although a very intellectual animal, has no reasoning powers, but merely highly-developed instinct. No amount of chastisement will enable him to think for himself; the only thing that can be trained into him by chastisement is to listen and implicitly obey his master. Therefore, if he refuses to pay attention when called on to stop, the stick is the only remedy.

It must be borne in mind, however, that no two dogs are like in disposition. One may require very little stick and another much more, so that every trainer should study fully the disposition of his pupil. Before laying a stick across a dog's back the trainer should stop to consider who is deserving of the stick, the trainer or the dog. Passion must not take control, and both the trainer and the dog must know what the chastisement is for.

It is particularly important not to keep more dogs than there is work for, and no attempt should be made to handle two young dogs at once.

There is no more intelligent and faithful animal than the sheep dog. He is ever ready and willing to do his utmost for his master if only he can be made to understand what is required of him. This problem of understanding is with him right throughout life, and too many die as they have lived—perplexed.

Acknowledgments

Illustrations are from photographs by L. Baker, Rissington, Hawke's Bay.

The article is adapted from a booklet compiled by the author on behalf of the Main Trunk Centre and endorsed by the North Island Sheep Dog Trial Association, to whom thanks are due for permission to republish.

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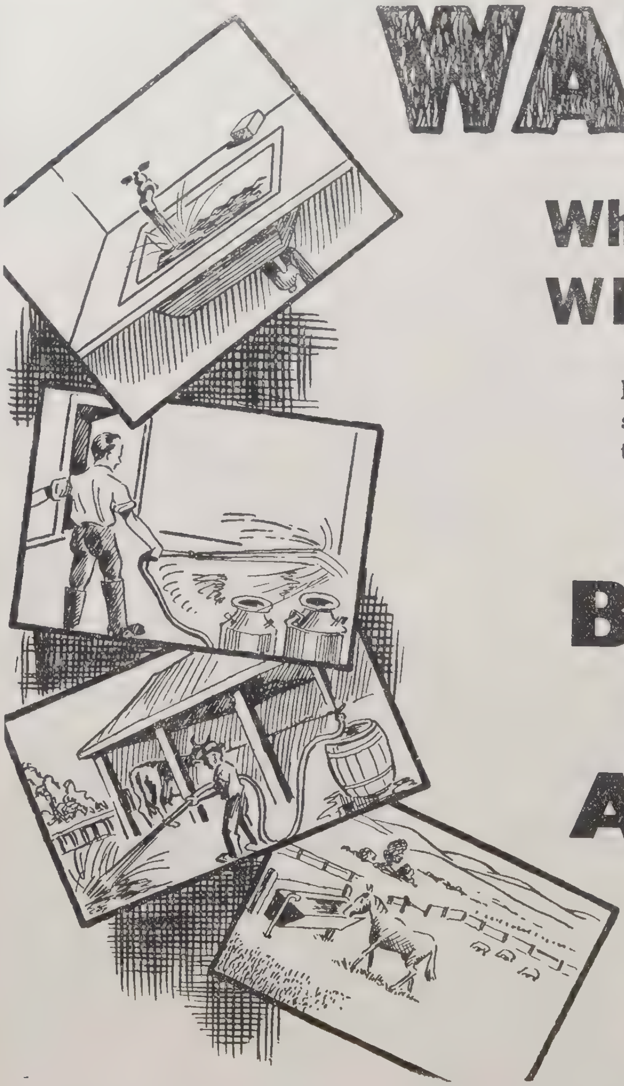

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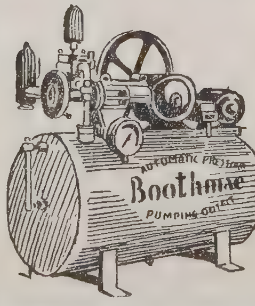

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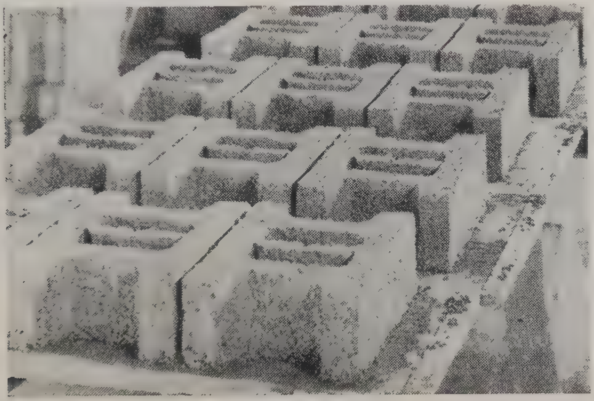
Developments in Building Materials—and Their Uses

By P. S. SYME, *Instructor in Agriculture, Warkworth.*

EVER since some unrecorded genius first invented mortar, the materials used in building construction throughout the centuries have changed but little. In view of man's primal need for shelter, it is rather surprising to find that while he could design and build the magnificent castles and cathedrals of the Middle Ages, his genius for invention failed for so long to find acceptable substitutes for timber, stone, or brick.

IN contrast to the comparatively limited range of material available in the past, the builder of today has a choice of the widest variety. Timber, it is true, is becoming scarcer and dearer, but, fortunately for the prospective home builder, alternative materials are constantly being devised, so that the quantity of timber needed can be very considerably reduced without any of the ill effects commonly associated with the use of substitutes. Indeed, from the point of view of attractiveness, economy, and durability, these substitutes are unrivalled and set new standards in building technique.



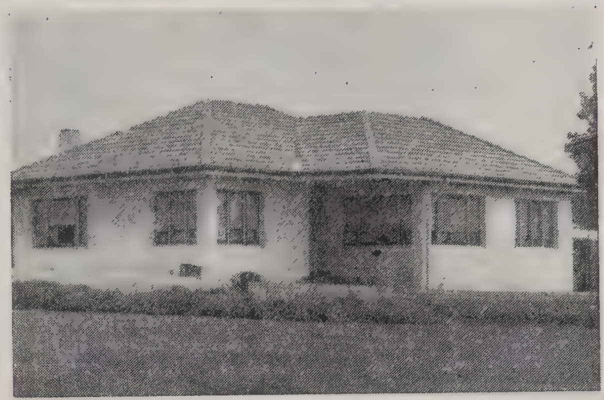
Showing a line of hollowstone blocks laid out to "set" immediately after being turned out of the casting machine.

[*Robin C. Wood photo.*

Concrete Prime Choice

Since the invention of Portland cement in 1824 concrete has become one of the prime choices as a building material. It is relatively cheap, it is extremely accommodating to work with, while its strength and permanence are now proverbial. Used with reinforcing material, it is No. 1 choice for the larger types of city building. For the small private dwelling-house, on the other hand, the ordinary method of moulding concrete has not proved quite so popular.

In the past many efforts have been made to utilise the obvious virtues of concrete for home building, and, at the same time, to overcome certain inherent defects common to direct-mould walls. One of the most promising developments is the use of pre-cast, vibrated concrete blocks designed on the hollowstone principle. This hollowstone construction, the mass production of which is a comparatively recent innovation here, was first used in the U.S.A. about 15 years ago, and has won a considerable degree of popularity, being particularly favoured on certain of the earthquake areas along the Pacific coast.



Hollowstone blocks make a very attractive building. They can be left in their natural colour or given a coat of coloured plaster if preferred.

[*Robin C. Wood photo.*

Hollowstone Blocks

Some of the advantages possessed by hollowstone blocks are obvious even to the layman. The hollow space reduces the amount of material required by about 40 per cent., thus effecting a considerable saving in manufacturing costs as well as a reduction in the weight, which in turn is reflected in lower freight charges. As the blocks are so designed that the hollow portions are superimposed throughout the height of the wall, this provides the insulating effect of double-wall construction in one building operation. Provision is also made for air currents to enter along the bottom of the wall and to circulate through it both vertically and horizontally, thus ensuring against any possibility of dampness. In addition, the high class of the aggregate employed, together with the intense vibration used in the casting process, results in a concrete of maximum density with a minimum absorption of water under rigorous tests, so it will be appreciated that the bogy of dampness often associated with the old type of concrete wall has been effectively laid at last.

A house built of sidings can be made to look very attractive and, as no charges are incurred in painting, the subsequent upkeep cost is low.

While the advantages mentioned are evident to the layman, the hollowstone block has still other claims to the public favour which are perhaps better appreciated by the practical builder. By inserting steel rods through the vertical hollow columns at corners and wall ends or where additional strength is considered necessary, and then filling in with cement, the wall can be strongly and simply reinforced so that it is resistant even to severe earthquake shock. This, particularly in some districts in New Zealand, should make strong appeal.

The blocks are constructed in two widths—6in. and 8in., both being 12in. long by 4in. deep. The 6in. size is designed mainly for an outside veneer, which is built round a normal wooden framework and acts as a permanent protective wall.

The 8in. block is employed where the wall itself carries the weight of the roof and ceilings, and consequently no studding is required. If desired, the interior wall may simply be treated with a smooth plaster finish, which can be papered or coloured, but it is more usual to construct a framework of 2 x 1 timber which is nailed to wooden blocks let in to the masonry in the course of erection. This framework can then be covered with one of the modern lining materials which are now proving so popular for interior walls.

Experience has shown that concrete blocks are easy to lay and that the work can be performed by any good handyman. Apart from the two sizes mentioned, the blocks are made in three different patterns — standard, square, and corner—so that there is practically no wastage. Since the standard block is 12in. long by 4in. high, this means that three blocks are required for each square foot of wall, and it is a simple matter to make a close estimate of the number needed for any particular job. The cost of the blocks works out at about £27 10s. per 1,000 ex works, and an average house requires from 3,500 to 4,000 blocks.

Though the natural colour is an attractive light grey, the concrete surface takes plaster readily and can be finished with a variable range of washes to any desired colour. This work, like the building, can be performed by any good handyman.

It is claimed that concrete blocks compare favourably with brick and cost little more than first-class timber where freight costs are equal. Although the blocks are carried by rail at the low freight rate, the cartage costs might compare rather unfavourably with timber where this is available near the site. Considered from the long point of view, however, any slight disparity in the building cost may be more than offset by the difference in the maintenance costs. Once erected, concrete is truly permanent and the upkeep costs are negligible.

Weatherboard Substitutes

Another development of interest in New Zealand at the present time is the use of asbestos cement sidings in place of weatherboards. These sidings, though new to this country, have been widely employed in the United States, where they have quickly achieved a wide popularity.

The material used, asbestos and cement, is mixed in a pulp with water and manufactured on a system somewhat akin to that used in paper making. New Zealanders have long been familiar with the ordinary flat asbestos board and appreciate the strength and durability conferred by its two indestructible components. These same virtues are shared by the new sidings, which, however, possess additional advantages over the normal large-sized flat sheet. Being much smaller, the sidings are easy to handle and can be very conveniently packed for transport. They are made to a standard size, 24in. x 12in., in two patterns, one having a wavy lower edge and the other with a staggered-butt lower edge. Two colours are available, one in the natural concrete and the other bright white. To enhance the natural beauty and avoid any dead flat effect each siding is embossed with a cedar graining on the exposed surface. To facilitate loading and transport the sidings are packed in neat cartons of 20, together with 20 malthoid weathering strips for use in their erection.

Apart from the ease of handling due to their convenient size, the sidings

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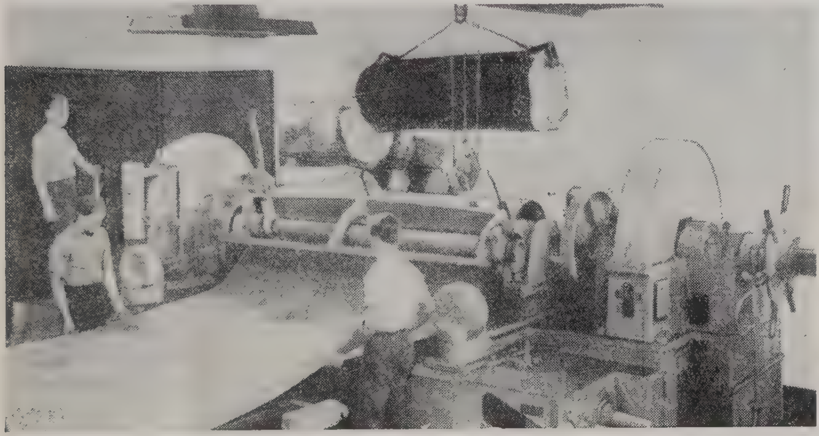
A close-up view of asbestos sidings, showing the attractive cedar graining. They can be obtained in two shades of white.

[*Sparrow Industrial Pictures photo.*



Plywood is constructed from thin sheets peeled from a log in a huge turning lathe. Before going in the lathe the log is cut to length and then softened in a steam vat. Photo shows a log being peeled in the lathe with another log slung up ready for inserting.

Cementing the sheets. After processing, three sheets are glued together with the grain of the middle sheet at right angles to the grain of the two outside sheets. A final treatment in a sanding machine produces a smooth and attractive surface.

are very easy to lay, so that the work can be expertly performed by an unskilled man. In building, the studs are erected in the ordinary way and the sidings nailed to cross battens of 3in. x 1in. timber spaced at appropriate distances. To assist in speeding up the work each siding has the nail holes already punched, so that it is only necessary to lay it in position and drive in the nails. Since all the nail holes are accurately placed and the nails for each successive siding register with the edge of the one immediately below it, the work is largely of a mechanical nature and is practically foolproof. By using a half-sheet at the commencement of each alternate course the adjoining ends of any two sidings line up with the middle of the siding above and below, thus preventing any possibility of leakage.

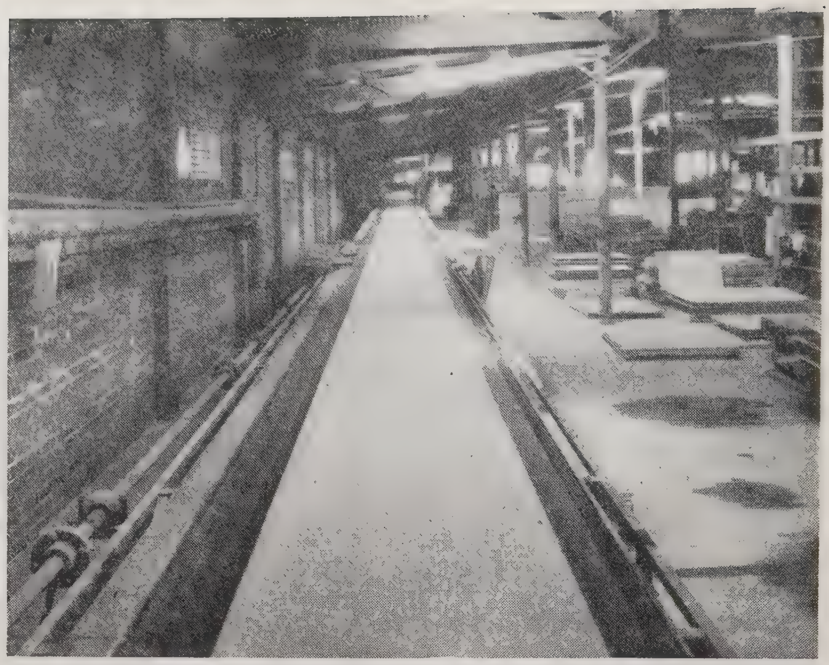
As a further insurance against dampness the wall is lined with tarred builder's paper and a strip of malthoid is fitted under the end junction before each siding is nailed in position.

The sidings can be cut or sawn if desired, but for greater convenience and to expedite the work a special tool is made available so that cutting, punching, mitring, and cornering can be performed with a minimum waste of time or material.

This new method of construction can compete with ordinary timber weatherboard even where the timber has an undue advantage in much shorter freights. Actually, on account of the compact system of packing employed, the cartage costs work out surprisingly cheap, 100 sq. ft. weighing only 140lb. It is claimed, however, that the sidings possess many advantages over wooden weatherboards which would more than justify a considerably greater cost. Apart from the speed and ease of erection of sidings, no painting whatsoever is needed and the subsequent upkeep charges for protection from the weather are nil. Since the individual sheets are only 2ft. x 1ft., repairs in the event of a breakage can be effected efficiently and simply at a trifling cost. From the aesthetic viewpoint, also, the pleasant colour and the cedar graining—both everlasting—combine with the novel edging design to produce a weatherboard effect which is both attractive and distinctive in appearance. Considering some of the manifold advantages of sidings over older methods of construction, it is not surprising that they have proved so popular in America, and it may safely be predicted that this success will be repeated in New Zealand.

New Interior Linings

While fashion and invention have together wrought obvious improvements in external appearance, there has also been a noticeable tendency to adopt new materials for interior linings. At one time timber boarding covered over with scrim was almost universally employed for papered walls. Now it is seldom seen in the modern home, preference being given to one or other of the several new manufactured materials which are much more versatile. Two representatives of this modern trend are plywood and gibraltar board.



How a gibraltar board is made. A mixture of plaster of paris, pumice sand, and water is fed between two moving sheets of tough paper drawn from huge rolls at the far end. The length and speed of the moving platform are so arranged that the plaster has time to form its initial "set" before the completion of its travel to the end of the platform. The sheets are then cut to size from the end of the moving ribbon.

[*Doree and Sache photo.*

Plywood, now extensively produced in New Zealand, has leapt into rapid favour and is winning its way by sheer merit. Although relatively expensive when considered as board, it is probably the least wasteful form which has yet been evolved for the utilisation of timber. The log provides the raw material for boarding or for three-ply alike. Obviously, however, when a round log is sawn up for boards the percentage wastage must be very high. On the other hand, when used for plywood, which is peeled from the log, the wastage is comparatively small. In its progress through the factory the log is first cut into lengths and then steamed till soft in a huge vat. From the vat it goes to what is in effect a huge turning lathe. As the log turns a thin continuous sheet of veneer passes on to a moving platform where it is cut into the desired lengths. After processing three such sheets are glued together in such a way that the grain of the wood in the two outer sheets runs at right angles to the grain of the inside sheets. For this purpose a casein glue of great strength is employed, the sandwich being heated and subjected to terrific pressure in a special press, so that the three thin sheets become virtually one sheet, of tremendously-increased strength. The fact that the famous Mosquito aircraft is built on this principle is a striking testimony to the strength and toughness built into this fragile-looking board. Plywood is now obtainable made from a wide range of timbers, some of them showing a beautiful grain with a smooth, attractive finish ideally suited for wall panelling or for the new type of plywood door which is now becoming so deservedly popular.

Gibraltar board is now universally known and has indeed become a household word throughout New Zealand. In the process of manufacture a mixture of pumice sand and plaster of paris wetted to the right consistency is fed between two sheets of specially-made tough paper travelling slowly along a moving belt and drawn from two huge rolls. The length of the moving belt and its speed are so adjusted as to allow the mixture to form its initial set before it reaches the far end, where the strip is guillotined into convenient sized sheets, which are then oven-dried and stacked ready for use. The sheets are available in thicknesses of ⅜in. and ¼in., according to requirements.

The insulating qualities of gibraltar board—equally effective for heat or sound—are as well known and appreciated as its fire-resisting properties and its immunity from attack by vermin or borer. It is also easy to erect, it can be used either for flat or curved surfaces, and is equally well adapted for papering or for taking any of the many attractive enamels or paints. Added to these virtues it is made in New Zealand from New Zealand material, and the fact that about 15,000,000 sq. ft. is used each year is a tribute to the public appreciation of its many excellent qualities.

Much has recently been spoken and written concerning the need for proper amenities for the man on the land and the need to check the drift to the city. Deplore it as we may, this drift will continue unless country life can be made more attractive. The home is the centre of the family life, and it must exercise a profound effect on the happiness and outlook of its occupiers.

The modern building materials can be used as effectively in the country as in the city. Viewed even from a purely financial aspect, a convenient, attractive, and up-to-date home adds greatly to the monetary value of the property, and, far more important, it helps to make life more worth living, particularly to that most deserving person, the farmer's wife.

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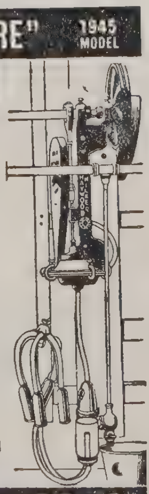

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SHORT-ROTATION RYEGRASS

Its Breeding and Characteristics

FARMING systems the world over are governed largely by soil and climate; where the temperatures are mild and the rainfall copious permanent grasslands of high production are characteristic, or, if not characteristic, they are potentially so. As climatic conditions harden and as the rainfall becomes less reliable, permanent grass fluctuates seasonally and fails to provide an all-the-year-round grazing. Special-purpose pastures, young pastures, or fodders become necessary. The pasture then rightly fits into a long-rotation pasture system. Where soil and climate fail to support permanent or long-rotation pasture, particularly in the summer and winter, and where conservation of winter and spring rains is necessary to produce a profitable crop, the pasture break-up becomes necessary every 3 to 4 years, and we have typically a short-rotation farming system. Where climatic extremes are great—cold in winter and hot in summer—the annual plant dominates the farming, as in the great corn and cereal belts of the world, or, if pasture is used in these zones, it is either of the annual or two-year type or permanent grass of very low production.

It is the function of the ecologist and the plant breeder to cater for these various farming systems, and in so far as this is done systematically and purposefully one cannot go far wrong in presenting to the farmer the best types of plants, grasses, and cereals or fodders for his particular farming system.

The genus Lolium, to which all the ryegrasses belong, offers enormous scope in breeding and in evolving plants that are of infinite value to a very wide range of farming systems. Wimmera ryegrass is a valuable 3- to 6-months annual that caters well for the dry belts of Australia; western wolths ryegrass is a winter annual for one-year pastures; Italian ryegrass is a one- to two-year plant for the temporary pasture, and the true perennial ryegrass can be used widely in rotational and permanent pastures.

There is, however, too large a gap between true perennial ryegrass and true Italian ryegrass, and many years of breeding and selection within these species accentuated the gap rather than reduced it. Seed certification, too, has tended to widen the gap between Italian and perennial in so far as both were purified and segregated strictly to their own species, i.e., neither mixtures nor natural hybrids were permitted under certification.

The short-rotation farming systems of the world have unconsciously selected a ryegrass type ecologically attuned to this system of farming. This came about first by mixing together Italian ryegrass and perennial ryegrass in the same sowing that gave rise, over a number of generations, to a hybrid sward that fitted the role well until such time as deterioration of the hybrid set in as a result of climate and environment, together with uncontrolled promiscuous crossing within the hybrid itself. Seed production, crop after crop, mainly in the maiden year of sowing down, led to the segregation of the earlier-maturing, free-seeding types, and free hybridisation between these poor agronomic types took place. These factors were largely responsible for the poor hybrid type that came to be produced, and which failed ultimately to serve the purpose required.

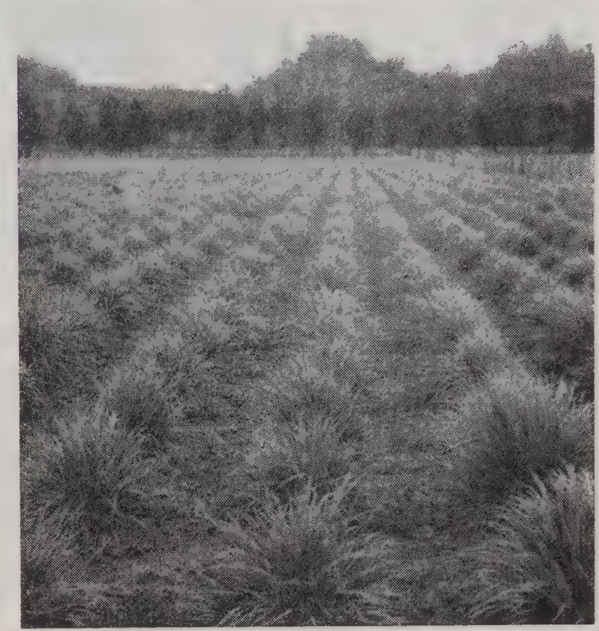

Fig. 1—Progenies from crosses planted out as spaced single plants for selection during the breeding of H1 ryegrass.

[*E. Bruce Levy photo.*

These natural hybrids pointed to the possibility under careful selection and controlled crossing by plant breeders of creating and maintaining a hybrid type that would serve the short-rotation system of farming.

Breeding work has now been conducted for 8 years by officers of the Grasslands Divisions, Palmerston North, in an endeavour to close the gap between Italian and perennial ryegrass. The short-rotation ryegrass is specifically designed to cater for the 3- to 4-year pasture and to act as a short-rotation element in the long-rotation or truly permanent pasture. L. Corkill, Senior Plant Breeder, Grasslands Division, Department of Scientific and Industrial Research, Palmerston North, has set out below the characteristics of this strain and the place it is likely to occupy in grassland farming.—E. Bruce Levy.

UP to the present there have been two species of ryegrass extensively used in pastures in this country, perennial ryegrass and Italian ryegrass. Perennial ryegrass is one of the most important grass species in permanent pastures in high- and medium-fertility country in New Zealand, while Italian ryegrass holds a similar position in the temporary pastures. Although these two species are closely related botanically, they differ widely in agronomic characters; for example, Italian ryegrass is an annual or short-lived species, while perennial ryegrass is a perennial or permanent species. Italian establishes more rapidly than perennial ryegrass and produces a greater bulk of herbage in the winter and early spring months, and is on the whole more palatable to stock.

Some years ago Mr. E. Bruce Levy, Director of the Grasslands Division, suggested that a type of ryegrass intermediate in its characteristics between perennial and Italian should fill an important place in grassland farming, particularly in districts where a system of short-rotation grassland farming is practised.

Subsequently the division directed attention towards breeding, by hybridisation of perennial and Italian ryegrass, a type which would possess as far as possible the desirable qualities of these two species; that is, it would combine some of the rapid establishment, high winter and early spring growth, and palatability of Italian with an appreciable degree of the persistency of perennial ryegrass. Such a type of short-rotation ryegrass has now been produced and released on the market as H1 (that is, Hybrid Number 1) ryegrass.

It is the purpose of this article, throughout which the term H1 will be used, to give a brief description of the breeding of this ryegrass and an account of its characteristics.

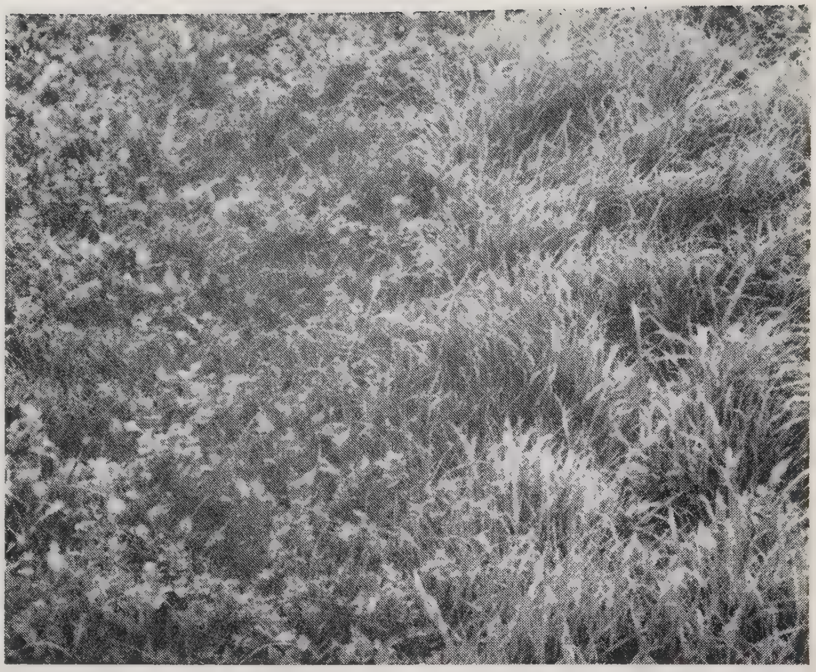

Fig. 2—Rate of establishment and weed suppression of H1 compared with perennial ryegrass. Left—Perennial. Right—H1.

BREEDING

Both perennial and Italian ryegrass are cross-fertilised species and are completely inter-fertile. They cross readily in the field, and the hybrids produced by this crossing show extremely wide variation. Indeed, many of the poor types of "false" perennial ryegrass so common in this country before the days of Government certification of true perennial ryegrass owe their origin to natural hybridisation between perennial and Italian and the perpetuation of the short-lived, free-seeding hybrids under an arable system of farming. A study of a large number of naturally-occurring hybrids, however, has revealed a small percentage of desirable plants.

The aim in breeding H1 ryegrass has been to obtain hybrids with the maximum development of the desirable features of Italian, and at the same time some degree of the density and persistency of perennial. Such plants to be used as a basis for breeding have been obtained chiefly from artificial hybridisation, but also to some extent from naturally-occurring hybrid lines of ryegrass. One in particular obtained from Mr. W. McGillivray, who procured it from an old pasture in the Manawatu, has provided some valuable hybrid plants.

As would be expected in plant material of hybrid origin, there are wide differences between progenies obtained from different crosses. The number of desirable hybrid progenies is relatively few and it is therefore necessary to study large numbers of progenies and plants in order to obtain sufficient desirable plant material to serve as a basis for producing the requisite strain. Progenies of hybrids are studied in the field as spaced single plants, each parent plant being usually represented by 50 progeny plants. Each season observations are made on some 10,000 progeny plants (Fig. 1).

Not only are there extreme differences between progenies obtained from different crosses, but there is often wide variation between the progeny plants of any one hybrid. In order to reduce this extreme variation the system of breeding known as "maternal line selection" has been adopted, and is applied after crossing selected perennial and Italian ryegrass plants and perhaps further crossing back to either perennial or Italian to obtain desirable plants. In this system the best hybrid plants of the required type are selected from the best progenies, isolated together so that they intercross, the progenies so obtained are planted out as spaced plants, selections are again made from the best progenies, and this process is repeated until finally a line consisting predominantly of plants of the requisite type is obtained.

Although breeding with H1 ryegrass has not been continued for a sufficient number of generations to produce a hybrid line as uniform in type as either pedigree perennial or pedigree Italian ryegrass, nevertheless H1 is sufficiently uniform to retain its type through a number of generations of seed harvesting. A comparison between plants produced from harvest-

SEEING THINGS THROUGH

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ings of H1 ryegrass three generations removed from the original has shown no appreciable change in plant type from the first to the fourth generation.

CHARACTERISTICS.

Rate of Establishment

An important characteristic in a pasture species is rapid establishment after sowing, particularly in its effect on the suppression of weeds in a new pasture. In this respect H1 is very similar to Italian and much superior to perennial ryegrass. In Fig. 2, where a comparison is shown of the establishment of H1 and perennial ryegrass sown at similar rates in adjacent plots, the suppression of weed establishment by the H1 ryegrass is evident.

Production Comparisons

Up to the present 42 paddock trials of H1 ryegrass have been sown by the Fields Division of the Department of Agriculture in co-operation with the Grasslands Division in different localities in New Zealand extending from Dargaville in the North to Winton in the South Island. These trials serve a very important purpose in providing direct information to the farmer himself on the characteristics of this type of ryegrass. In addition to these trials, smaller plot trials have been laid down at Palmerston North, Marton, Lincoln, and Kirwee, on which production measurements have been made. In Fig. 3 the seasonal production of H1 is shown, compared with that of pedigree perennial and pedigree Italian ryegrass. These figures represent the dry weight of ryegrass in pounds per acre produced in a trial at Palmerston North. The production figures have been grouped into three-monthly periods to illustrate the seasonal production of the three types of ryegrass. For this purpose the spring months are taken as September, October, and November. The plots were sown with 2 bushels of ryegrass and 3lb. of pedigree white clover per acre in March, 1943, and after two preliminary grazings the first production measurement was made on August 21, 1943, so that the figures for the first winter's production represent approximately two rather than three months' growth.

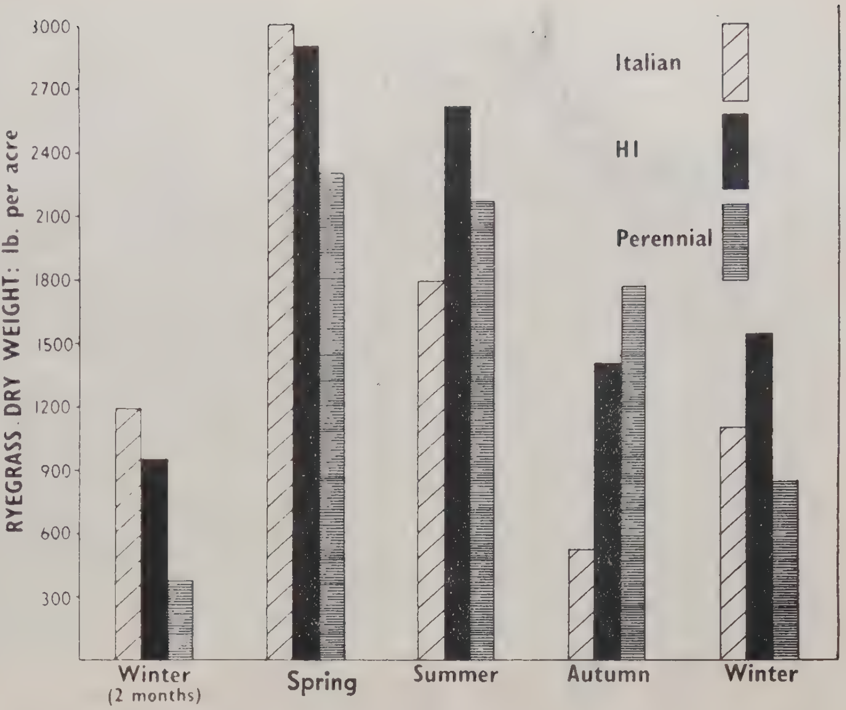

Fig. 3—Seasonal production of H1 compared with that of Italian and perennial ryegrass.

It will be seen that in the first season after autumn sowing the winter production of H1 is rather lower than that of Italian, but approximately 2½ times greater than that of perennial ryegrass. In the spring and summer months H1 is still superior in production to perennial ryegrass, although the superiority is much less marked than in the winter months. In the autumn the production of perennial is greater than that of either H1 or Italian ryegrass, the death-rate in the plants of the latter causing a rapid falling-off in production. The winter production of H1 in the following three months is again much greater than that of perennial ryegrass, although the superiority is not so great as in the first winter after sowing, for in the autumn a percentage of the H1 plants have also died out. The still greater death-rate in the Italian ryegrass is reflected in its relatively reduced production in the second winter compared with H1 ryegrass. The trial quoted here was not continued after the second winter, but figures to show the seasonal production of H1 ryegrass after the first year are provided by a trial sown at Marton in October, 1941, and on which production measurements are still being continued. One ½-acre paddock was sown with pedigree perennial ryegrass and pedigree white clover, and a similar adjacent paddock with H1 ryegrass and white clover. Up to August, 1945, the total dry weight per acre of ryegrass from the two paddocks was not significantly different, being 24,832lb. of perennial and 26,046lb. of H1 ryegrass. In winter production, however, H1 is consistently greater than perennial ryegrass. The respective yields, as dry weight of ryegrass per acre, for the four winters of 1942 to 1945 are as follows:—

As far as production is concerned the significant features of this type of ryegrass may be summarised as follows:—

1. High initial and first-year production. In the trial graphed in Fig. 3 the total production of H1 ryegrass in dry weight per acre for the 13 months illustrated was 24 per cent. higher than that of Italian and 26 per cent. greater than that of perennial, the figures being 9,382lb., 7,590lb., and 7,430lb. respectively.
2. High winter production. In the first winter after autumn sowing H1 is rather lower in production than Italian ryegrass, but much superior to perennial. This superiority over perennial ryegrass is maintained in subsequent winters under conditions where H1 is able to persist. Italian ryegrass rapidly falls off in production after the first summer, due to the high death-rate in the plants.
3. Relatively poor production in the autumn compared with perennial ryegrass. In this respect H1 behaves similarly to Italian ryegrass. In H1, however, the death-rate of plants in the first summer is normally not nearly so high as in

RESPECTIVE WINTER YIELDS OF PERENNIAL AND H1 RYEGRASSES

Winter.	Perennial ryegrass. lb. dry weight. per acre.	H1 ryegrass. lb. dry weight. per acre.	Relative yield. Perennial ryegrass = 100.
1942	441	749	170
1943	1,126	1,641	146
1944	688	1,295	188
1945	716	1,513	211

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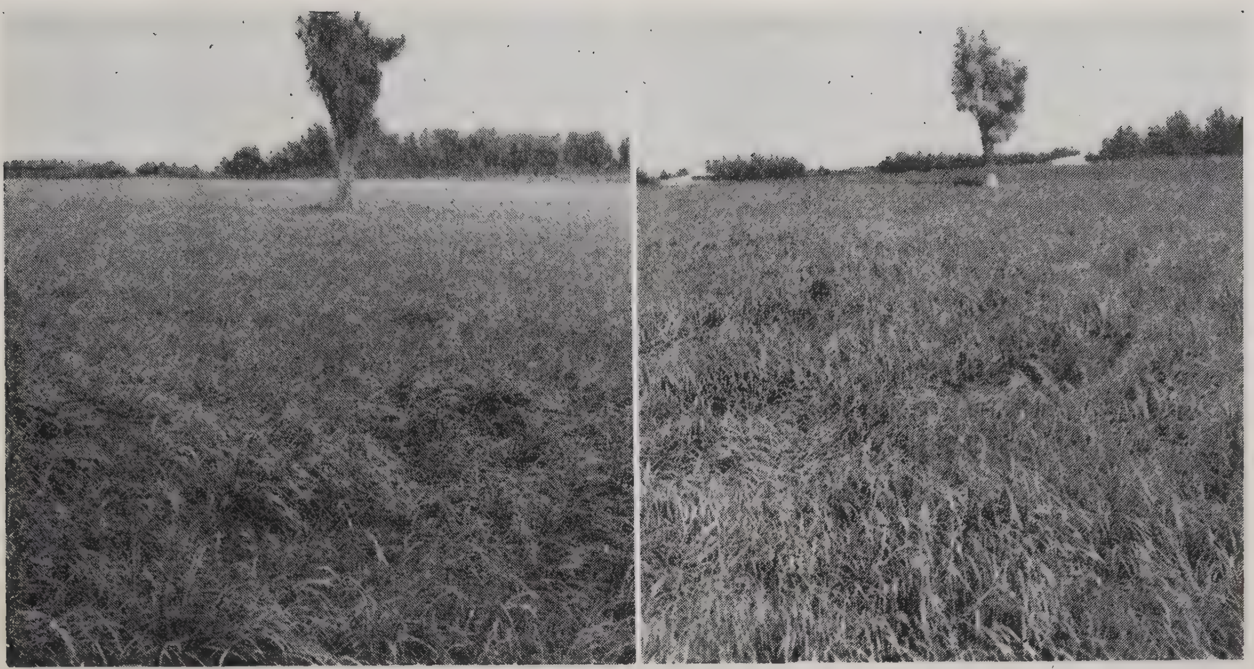

Fig. 4—Production and persistency of H1 ryegrass in a pasture mixture at Palmerston North. Left—Spring growth in the first year from sowing. Right—Spring growth in the fourth year from sowing.

[*E. Bruce Levy photo.*

Italian ryegrass and the plants are able to recover and produce vigorously in the next winter.

Persistency

Although the persistency of a species in a pasture is largely a reflex of environmental conditions, and is influenced by such factors as soil fertility, soil moisture, and pasture management, in general it can be stated that H1 is more persistent than Italian, but less so than perennial ryegrass. To give an indication of the relative persistency of H1, Italian, and perennial ryegrass, three of the earliest trials to provide information on the performance of H1 ryegrass may be cited.

In the first trial, sown on light alluvial country at Palmerston North, a paddock of 6½ acres was divided into two, one half sown with a mixture of 10lb. certified Italian ryegrass, 12lb. perennial ryegrass, 15lb. cocksfoot, and 3lb. each of white clover, Montgomery red clover, and subterranean clover per acre, and in the other half of the paddock 10lb. of H1 were substituted for the Italian. After the first summer the Italian ryegrass died out and formed only a minor proportion of the pasture, and in July, 1945, four years after sowing, the percentage composition of the swards was as follows:

PERCENTAGE COMPOSITION OF SWARDS.

	Perennial ryegrass.	Italian ryegrass.	H1 ryegrass.	Cocksfoot.	Other species.	Clovers.
Paddock sown with H1 ..	12	—	50	26	2	10
Paddock sown with Italian	24	trace	—	51	8	17

It will be seen that after 4 years H1 ryegrass was still forming a very considerable part of the pasture. This pasture had been fairly leniently grazed with dairy cows, and there may have been some re-establishment each autumn from seeding. It will be noted, however, that even under a type of management which may have permitted a certain amount of reseeding the Italian ryegrass in this paddock did not re-establish sufficiently to maintain itself. An indication of the persistency of H1 in this paddock is given in Fig. 4, where a view of the spring growth in the first and fourth years is shown.

The second trial was sown at Kirwee in February, 1942. One 8-acre paddock was sown with 16lb. of H1 ryegrass per acre together with pedigree white clover, pedigree Montgomery red clover, and Mt. Barker subterranean clover, while in an adjacent similar paddock pedigree perennial ryegrass was substituted for H1 in the mixture. In August, 1945, 3½ years after sowing down, the H1 in the first paddock formed 60 per cent. of the ground cover of the sward, while the perennial ryegrass constituted 68 per cent. of that of the second paddock. In this case under sheep grazing and conditions of relatively low fertility and soil moisture H1 has persisted almost as well as perennial ryegrass.

The third trial was sown at Marton in October, 1941. One ½-acre paddock was sown with H1 ryegrass and pedigree white clover and an adjacent similar paddock with pedigree perennial ryegrass and white clover. In July, 1945, nearly 4 years after sowing, the H1 in the first paddock formed 51 per cent. of the ground cover, while the perennial ryegrass in the second paddock formed 55 per cent. In this case, on medium class heavy country under sheep grazing, the H1 ryegrass has persisted well for 4 years.

It should be noted that the figures for persistency quoted here were obtained during the winter, when the growth of H1 ryegrass is vigorous. Had they been obtained in the autumn during the low productive period of H1, the comparison with perennial ryegrass would have been rather less favourable to H1.

Without citing further trials, it may be stated that in general H1 ryegrass is much more persistent than Italian ryegrass, but less so than perennial ryegrass. Under favourable conditions of soil fertility, soil moisture, and suitable management it may be practically a perennial, while under more adverse conditions of climate and soil fertility, where Italian behaves strictly as an annual, H1 will constitute an appreciable amount of the pasture in the second and third year.

Palatability

The palatability to stock of a grass species in a mixed pasture is influenced by many factors, such as its stage of growth and vigour of growth, its dominance or scarcity in the pasture compared with other species, the fertility of the soil, and the clover content of the pasture. That pasture species differ in their inherent palatability under similar conditions is, however, well known, and the relative good palatability of Italian compared with perennial ryegrass is common knowledge.

There is much evidence from field trials throughout the country that H1 ryegrass is similar in palatability to Italian and definitely more palatable than perennial. Moreover, it has frequently been observed that a proportion of H1 in a pasture of predominantly perennial ryegrass raises the palatability level of that pasture to stock. This is a particularly important feature of H1, especially in a new pasture where the clover content is not sufficiently high to be effective in raising the palatability of the pasture.

Seed Production and Yields

Average seed yields of H1 ryegrass are rather higher than those of perennial ryegrass. Flowering commences later than with perennial and slightly earlier than with Italian ryegrass. The period between flowering and ripening of the seed is similar to that of Italian, being shorter than in perennial ryegrass. The majority of the seeds have well-developed awns on the tips, but there is always a small proportion of unawned seeds. The seed sheds readily, but rather less than is the case with Italian ryegrass. It has frequently been observed that H1 ryegrass possesses marked ability to etablish from natural reseeding. In this respect it seems to be superior to both Italian and perennial ryegrass.

Little precise information has as yet been obtained on the susceptibility of H1 ryegrass to blind-seed disease, which in some seasons so drastically reduces the germination capacity of perennial ryegrass seed. There is no doubt that H1 is subject to low germination from blind-seed disease, but on the whole the reduction in germination capacity caused by the disease appears to be less than that of perennial ryegrass.

Use of H1 in Pastures

Depending on the particular circumstances, H1 ryegrass can be used advantageously in short-term or permanent pasture mixtures. In many districts, particularly in the South Island, it can be sown with white or red clover as a special-purpose pasture of short duration to provide winter and early spring feed and later a ryegrass seed crop. Its rapid establishment, high winter production, palatability, and moderately good persistency render it an ideal species to be used in a short-duration pasture, for which Italian ryegrass is too short-lived. Where H1 ryegrass is to be harvested for seed it is essential that neither perennial nor Italian ryegrass be included in the seed mixture, as these three species readily intercross and the resultant seed crop from such a mixture would definitely be rejected from certification.

Where ryegrass is not to be harvested for seed H1 ryegrass can be a valuable constituent of a permanent pasture mixture. Field trials have shown that Italian ryegrass, often sown as part of a permanent pasture seeds mixture, can advantageously be replaced by H1, which fills a similar role to Italian in establishing rapidly, suppressing weed establishment, and providing growth for early grazing, but has the distinct advantage of much greater persistency in the pasture. After the first summer Italian tends to disappear from a permanent pasture, leaving it relatively open and allowing the ingress of weeds, but with H1 ryegrass, in which the death-rate of the plants in the pasture is much lower, there is not this critical opening of the sward. As H1 is rather less vigorous than Italian in the early period of the establishment of a pasture, it has not the same smothering effect on the other constituents of the pasture mixture, and it can therefore safely constitute a greater proportion of the mixture. In fact, up to 50 per cent. of the perennial ryegrass usually included in a mixture can be substituted by H1, although experience has shown that a well-balanced pasture is obtained when the proportion of H1 is one-third of the total ryegrass sown.

A very important result of the inclusion of a proportion of H1 ryegrass in a pasture mixture is its effect in levelling out the annual production curve by raising the production in the winter months. In a mixture its low autumn production is of little moment, for at this period the production is maintained by such species as cocksfoot, timothy, red clover, and white clover. A further advantage of its inclusion in a permanent pasture mixture is its effect on raising the palatability of the pasture, particularly in the early stages before sufficient clover is present to be effective.

It is not expected that H1 will replace either perennial or Italian ryegrass; rather will it fill a place not adequately filled by either of these two species. As is seen by a comparison of their characteristics, each of the three has some important attributes not possessed by the others. Those of H1 ryegrass render it eminently suitable for use in pastures of relatively short duration where Italian ryegrass would be too short-lived, and also for inclusion in permanent pasture mixtures where its effect in raising winter production and increasing the initial palatability are particularly valuable features.

Seed Stocks

H1 ryegrass was harvested commercially for the first time last season, when some 6,200 bushels of machine-dressed seed were harvested. With relatively small seed stocks and a keen demand, the price of the seed is high. Indications are, however, that a much greater area will be harvested for seed this year, so that seed should then be more readily available.

◆

PASTURE PRODUCTION IN N.Z.

An outstanding summary of the appearance and uses of the grasses and clovers in the Dominion is given by S. H. Saxby in Bulletin No. 250, "Pasture Production in New Zealand." He discusses the different types of grassland with the management and seed mixture required for each. The top-dressing, harrowing, and topping of pastures, the making of hay and silage, the establishment of new pasture and many other important practical aspects of grassland management are dealt with in a clear and helpful manner.

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PAMPAS GRASS

IN view of the divergent opinions of many farmers on the value of pampas grass as a supplementary fodder for dairy stock, the Fields Division of the Department of Agriculture is at present carrying out investigations and has actually planted experimental plantations where the various contentious points raised can be made the subject of close study. This work will take some time, and in the meanwhile it is felt that what information is available should be disseminated so that farmers who are considering establishing a plantation can be given some guidance.

PAMPAS grass has been grown in this country as a supplementary fodder for a number of years, the initial enthusiast being Mr. A. McClean, of Waitakaruru, who for 20 years has grown pampas for his herd and who during recent years has wintered his stock on pampas grass alone and has not made any hay or silage. While the growing of this crop has spread all over New Zealand, its main supporters are in the North Island, and despite the claims made for its usefulness, it has not been adopted to anything like the extent that it could have been in view of these claims. Hence the necessity for further investigation into the question of the place for pampas in the economy of our great dairying industry.

This much is known of it, however:

(a) It can be grown over a fairly wide range of country.

(b) The success of the stand will depend very largely upon the fertility of the soil and the treatment the pampas is given.

(c) It is very labour saving in feeding to the stock.

(d) Where pampas is grown under favourable conditions dairy stock winter quite well on it.

An analysis of these points in more detail reveals first of all the necessity to explode the myth that pampas grass is a wonder plant that can be sown in some dirty corner or infertile spot where blackberry and gorse are rife and where with no attention it will give more feed than existing known crops. No plant is capable of doing this, and yet there are farmers who have expected it of pampas and condemned it roundly when it failed to achieve the impossible.

Pampas, like any other grass or fodder crop, will return to the farmer only that yield that the treatment accorded the plant will justify, which means that if a farmer is desirous of establishing a satisfactory plantation of pampas grass for fodder for his dairy stock, he must be prepared to give it a reasonable chance by selecting a suitable piece of ground and treating the plantation well, particularly during the early stages of its establishment. Undoubtedly a well-drained, humus-rich loam such as a suitably-drained swamp furnishes the ideal medium for a perfect pampas plantation, but pampas grass can be and is being very successfully grown under conditions of much lower soil fertility. In actual practice it is surprising what a large range of soil conditions pampas grass will tolerate, so long as management methods are adopted that will give the plant maximum encouragement.

Selection of Site

A good site should have a definite relationship to the ultimate utilisation of the herbage produced. Hence a site would need to be chosen which offered easy access to a number of paddocks that could be used as run-off areas. Furthermore, since the plantation would mainly be grazed in the winter, it is rather important to anticipate the possible effect of excessive rainfall on both plantation and run-off paddocks. Again, from the viewpoint of utilisation it is usually preferable to have a rectangular plantation rather than a square one, for it is then much easier to feed off in breaks, each break requiring only a comparatively short length of fencing. The question of centralisation also merits some consideration, for while it not infrequently happens that attention is readily bestowed on those assets that are close and handy, anything too far away is apt to become somewhat neglected.

A good pampas grass site would also lend itself to easy ploughing and thorough subsequent cultivation during at least the first year of the plantation's life. Steep, broken hillsides or very weedy areas should be avoided, while permanently wet places should never be given any consideration.

What Plants to Grow

Well-rooted two-year-old plants can be relied on to give the best results, but some farmers prefer to purchase seedling plants. As the seedlings are relatively small when delivered, it is not wise to plant them out in their permanent quarters. A far better plan is to set them out in nursery rows in some fertile and well-sheltered position for a few months, and then to transplant them later on. For this purpose the nursery rows should be about 18in. apart to facilitate inter-row cultivation, while the seedlings require a 6in. spacing between plants. If planted as suggested, ¼ acre will accommodate at least 10,000 plants, or sufficient for a 10-acre plantation.

The length of time seedlings will require nursery treatment is largely dependent upon climatic and soil conditions and the general care given to them by way of cultivation. Generally, however, a period of 6 months should be ample, but in some circumstances double that time may not be too long. If, therefore, it is proposed to set plants out permanently, say in spring, it will be necessary under the most favourable conditions to secure the seedlings the previous autumn. Where general conditions are not so

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kindly seedlings purchased one season may not be ready to transplant until the corresponding period 12 months later. However, only a thorough local knowledge of the characteristics of soil and climate can accurately determine the proper time to undertake this work, but it is important to remember that pampas grass is hardier than many farmers seem to imagine.

In the selection of a suitable site for a nursery care should be taken to see that the area chosen is reasonably well sheltered, free from aggressive weeds, capable of being easily cultivated, with soil of a fairly fertile nature and well drained. Should the soil be naturally light and humus lacking, the deficiency can be remedied by working into the ground plenty of well-rotted animal manure, which is so abundant on all farms where animals are grazed. Then with a little phosphate or blood and bone dusted along the rows of seedlings and worked in by cultivation there should be no cause for their failing to make strong, healthy plants for transplanting at a later date. Since about 1-40th acre will accommodate sufficient seedlings to plant a 1-acre plantation, numbers of farmers use part of their kitchen garden for the purpose of a nursery. For the most part this practice has proved an ideal one and is to be thoroughly recommended.

The question of strain of plants is much debated and is the subject of trial by the Department, but the only advice that can be tendered at present is to ensure that purchase is made from a firm of repute.

Time to Plant

The time to plant depends almost entirely upon climatic conditions, although, of course, soil and other factors could easily have a bearing on the matter. Generally, however, where the winter season is long and rigorous but the soil during summer retains a reasonable amount of moisture, a spring planting is preferable to that of any other period. If, on the other hand, there is little to choose between the rigours of summer and winter, a risk taken during the latter season is to be preferred. In districts enjoying a relatively mild climate it is perfectly safe to plant pampas either in the spring or autumn.

Actually pampas grass is far hardier than most people seem to think, and provided the plants are sturdy, well-rooted specimens when set out and care has been exercised in carrying out this work, the species will stand up to a lot of dry weather and tolerate a series of severe frosts without suffering undue injury.

Method of Planting

Allowing for sufficient distance from enclosure fence—at least 9ft.—approximately 750 plants are needed for an acre of plantation. Plants should be set out in rows 7ft. 6in. apart, and there should be a distance of 7ft. 6in. between plants in the rows.

A space of 9ft. should be provided between fences and pampas grass, otherwise stock stretching over to reach the grass will cause serious damage to fences.

To do the job properly, and in accordance with the potential usefulness of the plantation over many years, there is actually a good deal of work to be accomplished up to the stage of finally having the plants set out in position. The job is really not difficult, but experience has shown that with very few exceptions slap-dash methods definitely do not pay.

Assuming that a plantation site as suggested above has been selected and suitable plants are on hand, the first task in a majority of cases would be the thorough cultivation of the area. When a satisfactory tilth has been secured the ground should be marked out into 7ft. 6in. rows and then cross-marked at right-angles to the original lines. This will produce a series of intersecting lines spaced 7ft. 6in. apart,

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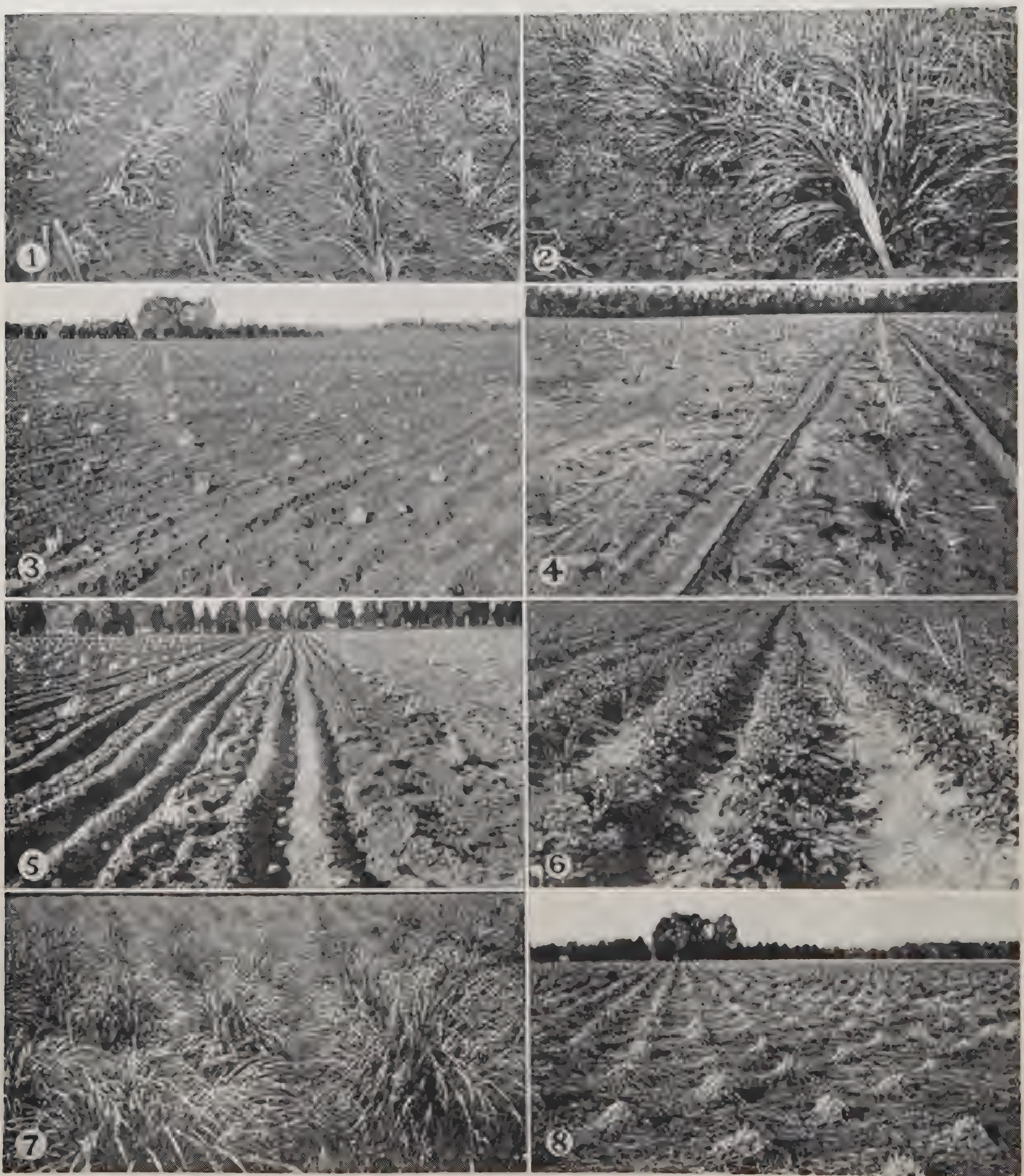


Fig. 1—Seedling pampas grass plants set out in nursery rows before the establishment of the permanent plantation. Fig. 2—Part of the same nursery shown in Fig. 1 5 months after being set out. Fig. 3—The plants shown in Fig. 2 after the top growth had been cut away and they had been transplanted into their permanent position. Fig. 4—Part of a relatively large pampas grass plantation. Fig. 5—Two rows of early potatoes planted between the rows of pampas grass as one method of utilising the waste land between the rows of newly-transplanted pampas. Fig. 6—The same plantation as in Fig. 5 2 months later. Fig. 7—The growth of pampas grass a few months after harvesting the potato crop and 12 months following transplanting. Fig. 8—What was left of the pampas grass shown in Fig. 7 after it had been fed off for the first time the previous winter.

and it is at each of these intersections that a hole approximately 9in. in diameter and 9in. deep is dug to accommodate the pampas grass plants.

At this stage on all but the most fertile soil types a liberal dressing of well-rotted animal manure or compost should be placed in the bottom of each hole and covered over with a thin layer of soil. A generous handful of blood and bone fertiliser will take the place of the animal manure or compost to some extent if neither of these materials is available, or if they are available only in insufficient quantity.

The next step is to set out the plants in the prepared holes. If the plants have been raised in nursery beds, all top growth should be removed to within about 12in. of the ground before lifting, which will not only greatly assist the plant to re-establish itself, but will also simplify the task of handling it. Should mature plants have been purchased ready for setting out permanently, the necessary trimming of top growth will usually have been attended to prior to dispatch from the nursery.

When planting it is important to see that all roots are as little damaged as possible, and those that are, either through excessive drying-out or on account of breakage, should be trimmed back to sound tissue with a sharp knife or grass clippers. Care is also needed to see that the rooting system is not a tangled mass on insertion into holes, but that it is well teased out and with roots radiating evenly from crown of plant to wall of hole. The soil should then be drawn in around each plant and well consolidated by thorough tramping, leaving a slight depression of about one inch for the collection of moisture when general conditions make this necessary. While the depth to plant can obviously be governed only by the size of the plant, it can be taken as a fairly safe rule that if the roots are well covered, a sufficient depth has been provided.

Subsequent Cultivation

In the majority of cases it will be found a definite benefit to continue with cultivation until this work can no longer be carried on owing to the growth of plants. As a general rule it will be found that inter-row cultivation can safely be proceeded with for at least 12 months; after that the growth of the plantation must largely determine the practicability of further work of this nature.

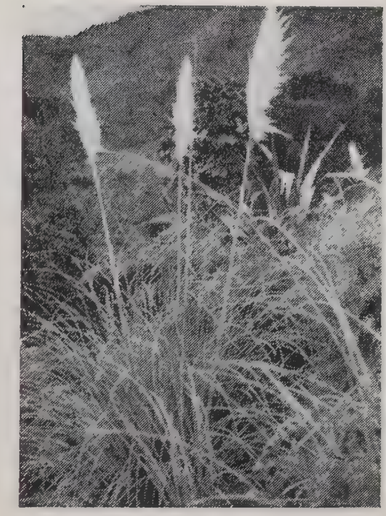
Since the demands of pampas grass for moisture, plant food, drainage, sunshine, and air are similar to those of every other economic crop grown, every requirement of the plant must be studied and provided if normal development is to take place. Hence inter-cultivation is essential for the rapid growth of healthy plants, for without it weeds will not only effectively rob the soil of moisture and plant food, but will also restrict the free circulation of air and materially shield the plant from the beneficial rays of the sun.

If during the first 12 months it is desired to reduce to a minimum the effect of the unproductive land between the 6ft. rows of young pampas grass plants, it is quite a sound practice to plant a row of potatoes or similar crop between the rows. The cultivation, manuring, and general care needed to bring such crops to a payable maturity will also react to the advantage of the pampas grass.

Deflowering Advisable

Removing all flower heads to prevent the plantation from flowering is recommended. This is particularly necessary during the first few seasons of the plantation's life, but is advisable at all times. Stock given access to the area during late February will deflower the plants by eating the flower stalks first in preference to the rest of the plant.

No definite time can be set down for feeding off, as so much depends upon the growth made by the plants. Such growth will, in turn, depend upon the many factors already mentioned, not least among which would be the care given to plants subsequent to setting out, but under more or less ideal conditions pampas grass can be in a condition for initial grazing 18 months from planting. In less favourable circumstances, however, it may require 2 years or even 3 years to bring the plantation to a grazeable condition. The best method of feeding off is undoubtedly that popularly known as "feeding in breaks," by which the considerable wastage that otherwise is inevitable is substantially reduced. Moreover the herbage is kept much fresher for stock than would be the case if they were allowed to roam at will over the entire plantation.



Pampas should at no time be permitted to flower.

Under average conditions a well-grown plantation not less than 3 years of age can usually be fed down twice a year, say at 6-monthly intervals, without suffering undue harm. Constant grazing will, however, eventually kill the plant, while under-grazing will cause the accumulation of a large quantity of herbage of low feeding value. For the most part a plantation established less than 3 years should not be grazed more than once in 12 months, but there are circumstances in which it would be quite permissible to do so. For instance in the case of a plantation established under the most favourable soil and climatic conditions it can easily happen that good stock fodder is wasted if not utilised more than once a year. As with many other problems on the farm, experience finally will have to deter-

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Wellington and Hawke's Bay: Chief Agents—**McClean's Pampas Grass Coy., Box 620, Wellington, or Premier Products Ltd., Huddart Parker Bldgs., Wellington.**
South Island: Chief Agents—**Premier Products Ltd., Huddart Parker Bldgs, Wellington.**

mine the exact amount of grazing a pampas grass plantation will tolerate with impunity.

Treatment After Grazing

In the absence of any experimental evidence on the subject no hard-and-fast rule can be laid down about treatment after grazing. From observations of plantations that have been regularly fired and others not so treated, apart from a general appearance of tidiness in favour of firing, there seems little to choose between the two types of treatment. It is conceivable that through the ultimate decomposition of the litter the soil would become enriched in humus, but on the other hand the ash left after burning off the litter is probably rich in available minerals as stimulating to the plant as humus in some circumstances.

In conclusion it should be emphasised that the growing practice of pampas grass culture is a perfectly sound one provided that (1) the elemental conditions are satisfactory to the plants' well-being, and (2) the grower sufficiently appreciates the part he is required to play in bringing to fruition the aspirations he entertained when first deciding upon the establishment of a pampas plantation. Given these two conditions, there is no reason why the culture of pampas grass should not be an unqualified success, and in view of the plant's perennial character, palatability, high yield, and nutritive value it will be found a wonderful standby in all periods of abnormally low feed production.

Pig Industry Broadcasts

UNDER the auspices of District Pig Councils broadcasts will be delivered in December as follows:—

Auckland—1YA, on December 19, at 7.15 p.m., "Housing and Sanitation," by C. Wallace, Supervisor, Waikato Pig Council.

Dunedin—4YA, on December 10, at 7.15 p.m., "Costs and Returns in Pig Production," by N. McDonald, Supervisor, Otago and Southland District Pig Council.

Napier—2YH, on December 13, at 7.15 p.m., "How not to Keep Pigs," by H. Hopkins, Supervisor, Tairawhiti District Pig Council.

Palmerston North—2ZA, on December 21, at 7 p.m., "Common Ailments," by W. J. Croucher, member of Wellington District Pig Council.

"Journal" in Japan

MOST of the Notes delivered in Tokio recently have been of a military—and even history-making—significance. Among the British Fleet mail distributed in Japan's surrendered capital on August 29 was a note from the Department of Agriculture—a subscription renewal reminder to a naval officer on H.M.N.Z.S. Gambia.

Most "Journal" subscribers are familiar with the routine reminder notice which the Department sends out two months before a subscription expires. This one—dispatched on July 30 through the usual Service address, c/o G.P.O., Wellington—had a more glamorous journey and destination than most of its fellows. Amid all the momentous events of the last days of August the paymaster lieutenant found time to send 10/- to ensure his getting his "Journal" for the next four years.

Perhaps, in an atmosphere of surrender, the officer foresaw a day when swords would be beaten into ploughshares; or perhaps, like 43,000 others, he just might not like to be without his "Journal."

Grading of Export Butter and Cheese

Leading Dairy Factory Averages for Year Ended July 31, 1945

Contributed by the DAIRY DIVISION.

BUTTER-MANUFACTURING companies which have obtained an average grade of 94 points or over and cheese-manufacturing companies which have obtained an average grade of 93 points or over are listed below.

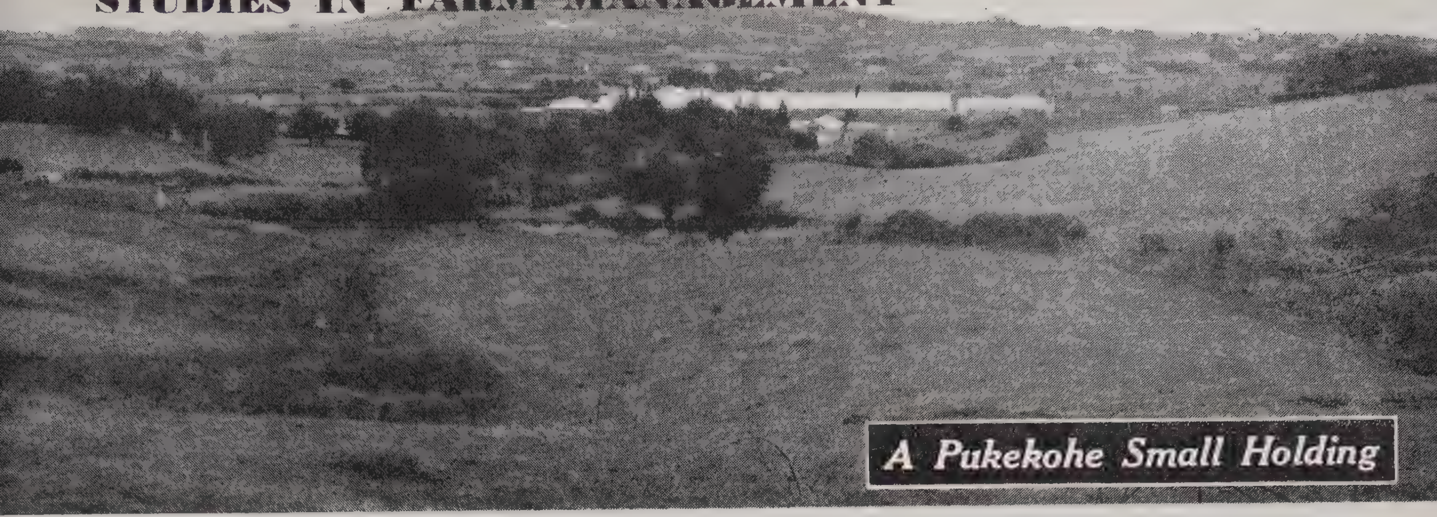
Of the total of 137 creameries or dual plant factories manufacturing butter for export, 12 are included in the list as compared with 20 for the previous year, and of the 263 cheese factories and dual plant factories manufacturing cheese for export, 21, as compared with 22 for the previous year, have averaged 93 points or over.

Of the total factories, 7 butter and 14 cheese factories are situated in the North Island and 5 butter and 7 cheese factories in the South Island.

Company	Regd. No.	Brand.	Tonnage Graded.	Ave. Grade.
		CREAMERY BUTTER.		Points.
Wairoa	1,345	Wairoa	110	94.361
Westland	145	Westland	228	94.330
United	1,296	Whariti	227	94.283
Kaikoura	302	Kai	249	94.263
Murchison	1,888	Airship	211	94.245
Karamea	1,570	Karamea	169	94.113
Kaikohe	40	Kaikohe	139	94.096
Konini	1,203	Konini	550	94.080
Inter-Wanganui ..	6	Inter-Wanganui ..	119	94.077
Mangorei	345	Mangorei	957	94.048
Ruawai	66	Ruawai	1,386	94.037
Rangiwahia-Ruahine	750	Quail	4	94.000
		CHEESE.		Points.
Tuturau	132	Tuturau	56	93.576
Opouriao	1,169	Opouriao	293	93.520
Morton Mains ..	1,604	Morton Mains	220	93.360
Rimu	1,155	Rimu	125	93.328
Joll, T. L.	1,723	Maori Chief	418	93.313
Mokotua	67	Mokotua	181	93.305
Patua	73	Patua	570	93.297
Bidwill	270	Bidwill	352	93.271
Okato & Puniho ..	48	Puniho	463	93.269
North Taranaki ..	723	Flax	163	93.254
North Taranaki ..	212	Waipapa	442	93.219
Greytown-Wairarapa	529	Greytown	752	93.206
Opunake	884	Opunake	449	93.202
Bell Block	488	Bell Block	429	93.181
Kaimata	992	The Oaks	460	93.163
Titiroa	361	Titiroa	78	93.163
Pahiatua	140	Pahiatua	29	93.133
Dalefield	9	Dalefield	824	93.122
Stirling	292	Stirling	122	93.107
Linkwater	775	Linkwater	144	93.031
Milton	1,030	Milton	70	93.022

STUDIES IN FARM MANAGEMENT

A Pukekohe Small Holding



[Sparrow Industrial Pictures photo.

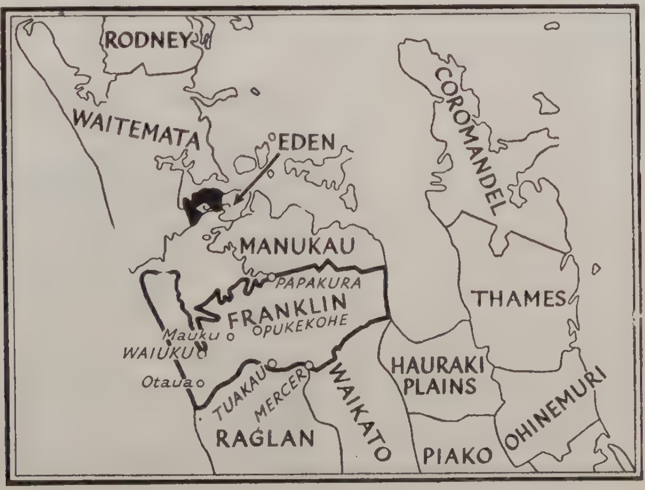
THE Pukekohe district has for many years been noted as one of the leading vegetable-producing areas in New Zealand, and in particular for its early potatoes, which appear in most North Island markets in October and November. This article by W. V. Hadfield, Instructor in Agriculture, Wellington, tells of a change-over from dairy farming to commercial vegetable production, and describes in detail some of the more important vegetable crops.

THE Franklin County, which is situated approximately 25 miles south of Auckland, comprises an area of 358,400 acres. It is bounded on the north by the Manukau Harbour, the boundary continuing in a straight line through to the Firth of Thames, which also bounds its eastern extremity. The Waikato River marks part of the southern boundary, which also extends from Mercer to the Firth of Thames. To the west the county is bounded by the Tasman Sea.

Topography

The extreme west of the county consists of a rolling sand-dune strip, inland of which is rugged country, interspersed with fertile strips. To the east of the county is the Hunua Range, which is covered with heavy scrub and bush, and is only partially developed. On the lower slopes of the range, however, are fairly fertile valleys which are farmed quite extensively. Twenty thousand acres of swamp land lie to the south of the county, some of which only awaits stop-banking, drainage, and development before it becomes comparable with other drained areas of the Dominion. The central portion of the county, on and around the Pukekohe Hill, is made up of a red-brown loam, which is eminently suited to the growing of vegetables. This soil is volcanic in origin and varies in fertility, depending on the amount of leaching which has occurred.

The Waikato River is one of the most interesting features of the South Auckland district, due to the part it has played in the geological formation of many of the districts through which it has flowed. It is thought that, after a very early eruption of Taupo, now an extinct volcano, the river was turned into the Bay of Plenty. Later disturbances appear to have altered its course to the north, where it emptied into the Firth of Thames. In following this course it turned the Waikato Basin into a lake, which was eventually filled in. Much of the Firth of Thames gradually filled in, and formed a great morass, which has now been drained, and makes up the Hauraki Plains. As the result of further disturbances the Waikato sought the sea, by way of the Waiuku Channel and the Manukau Harbour, filling up the 20,000-acre depression of Aka Aka and Otaua and silting up half the great bed of the Manukau. The river finally changed its course, breaking through direct to the Tasman, not far from its present mouth.



Climate

The climate is a mild one, with no great extremes of temperature. The mean temperature range on the average is only 13.7°. The relative humidity figure of 79 per cent. is high for New Zealand, and this, together with warm conditions which normally prevail, presents conditions favourable for crop diseases. The annual rainfall figure varies around 50in. and is fairly evenly spread throughout the year. The summer months are dry, due partially to the lower precipitation and also to the fact that the ground dries out very readily, because of the poor moisture-retaining qualities of the subsoil. Winds are only moderate, and only light frosts are experienced.

Early Settlement

The following accounts of the early settlement of Franklin and surrounding districts have been summarised from the late Henry E. R. L. Wily's book, "South Auckland: The Story Of Its Pioneers."

The first settler appears to have settled as a trader at Raglan as early as 1828. One or two Europeans settled at Port Waikato and Manukau, and by 1830 missions had been extended in South Auckland districts, and Maoris were instructed in agriculture. Naturally enough places which could be reached by water were the first to be settled, and for this reason Waiuku came early into prominence as a trading port.

In 1840 the selection of a site on the Waitemata for the capital of New Zealand gave an impetus to settlement, and Manukau and Franklin soon became settled. Two years later 500 farmer settlers spread out in these two counties. At this stage roads were non-existent, except in the vicinity of Auckland, and tracks and pack-horses were the only means of transport. By 1860 the Main South Road was metalled as far as Pokeno, and from it cart roads ran to link up the surrounding country. Until the time of the Maori Wars of 1863 the country was well populated. Papakura and Drury had become busy townships, and outside of Auckland Waiuku had become the most important business centre. Tuakau, Paerata, Mauku, and other districts became settled, and East Pukekohe was a compact farming community. After the Maori Wars settlers began to drift back to their farms, and there followed a period of intense immigration, and settlements were formed throughout the country. From 1870 the introduction of Vogel's Public Works schemes and the start of the railroad system marked a period of steady progress.

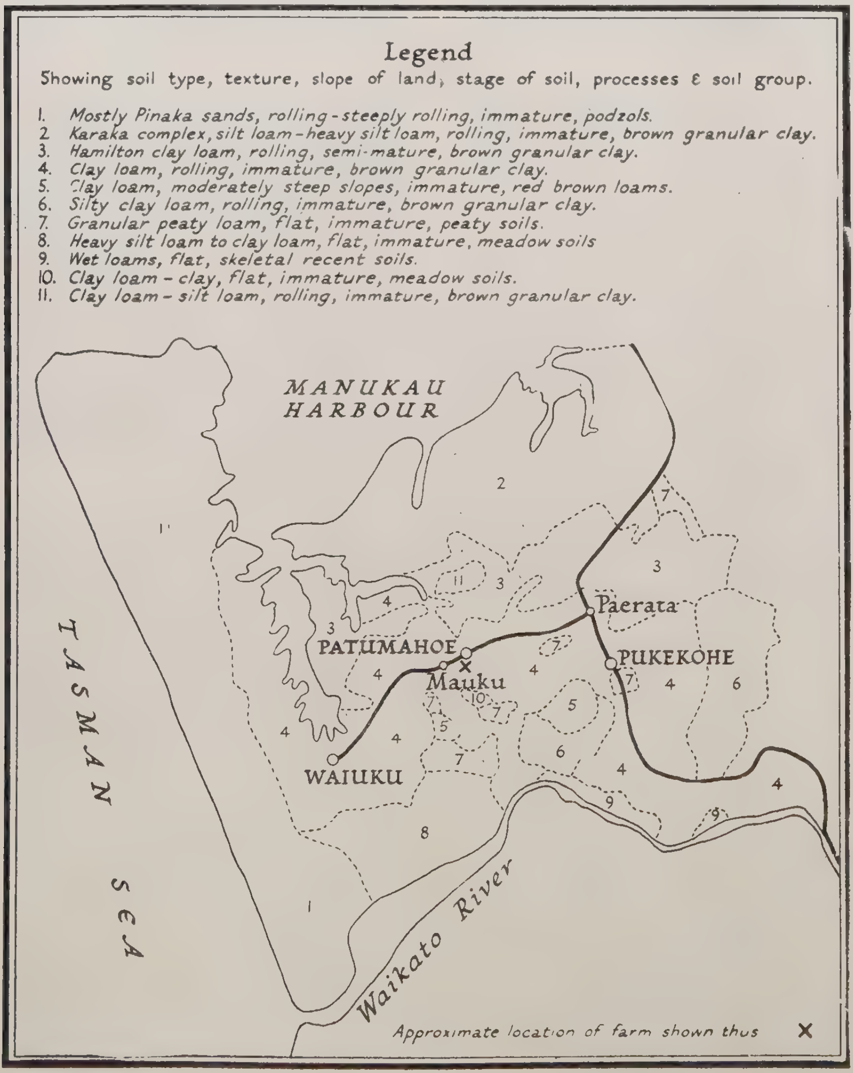
In the early stages land for settlement was marked by the usual land grabbing, and some land was purchased at ridiculously low figures. After the initial rush a settled Government saw to it that the Natives secured a reasonable price. By 1850 the greater part of Franklin had been acquired, except for blocks which were set aside as Native reserves. A year later the first sale of Crown lands is believed to have taken place.

Prior to grassing down much of this country was covered in forest, which was felled, and the grass seed was sown on the ashes. A good burn was usually obtained by careful underscrubbing, followed by tree felling. After a good burn had been secured it was usual to wait for rain to allow the ash to become incorporated in the soil before broadcasting the seed. Much of this bush felling, however, was indiscriminate, and in later years erosion set in on the slopes of the steep, broken country to the east. As a result of bush burn sowings, cocksfoot seed production became a new rural industry, particularly around Pukekohe. If a crop of wheat were desired, it was frequently sown with grass seed, and a yield of 35 bushels to the acre was not uncommon. Original fencing consisted of temporary rail fences, made of wood saplings, and although durable only for about 5 years, they were nevertheless reasonably stockproof. Later fencing was constructed from posts and rails sawn and split from puriri, and some of these are still in existence.

In Franklin the timber trade was established at an early date, and sawyers were active around the shores of the Manukau, and in the Hunua forest area, where totara was plentiful, though kauri was in limited supply. Puriri, a valuable hardwood, was plentiful on the volcanic land around Pukekohe. Kauri gum also was scattered throughout the area, and gum digging was a popular enterprise.

In the 50's a flax mill was set up near Waiuku, and at the height of the industry 40 or 50 mills were operating in Franklin alone.

South of the river potatoes, barley, maize, and pumpkins were grown. Flour mills, in operation further south, used the port of Waiuku to ship flour


Legend
Showing soil type, texture, slope of land, stage of soil, processes & soil group.
1. Mostly Pinaka sands, rolling-steeply rolling, immature, podzols.
2. Karaka complex, silt loam-heavy silt loam, rolling, immature, brown granular clay.
3. Hamilton clay loam, rolling, semi-mature, brown granular clay.
4. Clay loam, rolling, immature, brown granular clay.
5. Clay loam, moderately steep slopes, immature, red brown loams.
6. Silty clay loam, rolling, immature, brown granular clay.
7. Granular peaty loam, flat, immature, peaty soils.
8. Heavy silt loam to clay loam, flat, immature, meadow soils
9. Wet loams, flat, skeletal recent soils.
10. Clay loam - clay, flat, immature, meadow soils.
11. Clay loam - silt loam, rolling, immature, brown granular clay.
MANUKAU HARBOUR
TASMAN SEA
PATUMAHOE
Mauku
Paerata
PUKEKOHE
WAIUKU
Waikato River
Approximate location of farm shown thus X

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to Auckland, and shipments were actually made to California.

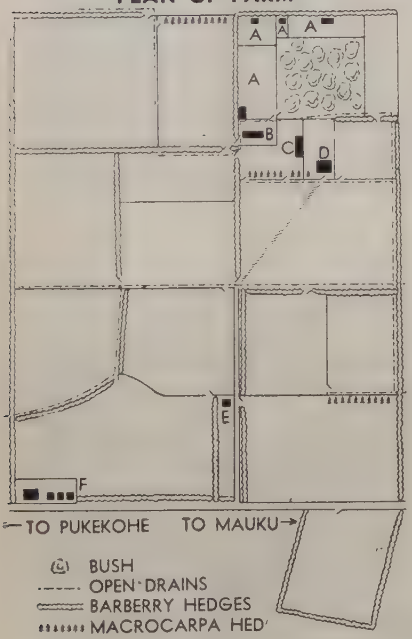
As other more suitable areas in the Dominion became developed, wheat growing disappeared, and the Franklin County became a pastoral area with market gardens predominating on the suitable land around Pukekohe.

Land Utilisation

The Franklin district is best described as pastoral, with dairy farming in ascendancy. Some good dairying land, however, is confined solely to sheep and fat cattle raising, while the more hilly areas not particularly suited for butterfat production are mainly sheep and cattle propositions. On and in close proximity to the Pukekohe Hill is a limited area of red-brown volcanic loam which is admirably suited for the production of vegetables. To the north of the county is a heavy silt loam, known as the Karaka complex, where a large area of peas is grown annually. A number of farmers on the better-class dairying land around Pukekohe are turning their farms over to vegetable production, and this article describes how this has been accomplished on one particular farm.

The following is a list of crops and livestock in the Franklin County as taken from the 1943-44 A. and P. statistics.

PLAN OF FARM



KEY: A. Piggeries. B. Cow byre. C. Implement shed. D. Homestead. E. Onion storage shed. F. Workers' huts.

CROPS AND LIVESTOCK, FRANKLIN COUNTY, 1943-44.

	Acres		Acres
*Market gardens	1,590	Pasture (cut for hay and silage) ..	25,594
			Nos.
Potatoes ..	869	Dairy cows in milk ..	78,116
Onions	288	Total cattle ..	128,538
Annual crops (other than market gardens, potatoes, onions)	1,857	Sheep shorn .	151,497
Pasture ..	209,419	Total pigs ..	30,823
Grain, etc. ..	769	Horses ..	5,156

Total area occupied .. 290,908 acres.
Average size of holdings .. 112 acres

*The area used for market gardening is actually higher than the figure shown, as a considerable area of market gardens on the Pukekohe Hill is within the Pukekohe Borough, and the A. and P. statistics do not include figures for areas within a borough.

A PUKEKOHE SMALL HOLDING.

The following study of a Pukekohe small holding exemplifies the process of changing over a typical dairy farm to vegetable production. The main feature of this change-over is that it has been accomplished without extra capital and has necessarily been a gradual one. This particular farm of 36½ acres, consisting of 15 paddocks varying from 2 to 4 acres, is not an ideal layout for a market garden. Prior to 1942 the farm was confined to dairying, with only 5 acres of cropping, which was regarded merely as a remunerative sideline. As a result of the appeal for vegetables for the Armed Forces, the owner decided to change his farm over to market gardening, to accomplish which it was necessary to bring pasture land into crop over a period of years, rather than to attempt an immediate change-over.

Location and Soil

The farm is situated 5½ miles west of Pukekohe, and 1½ miles from Mauku. The soil is a medium to light loam, varying in depth from 9in. to 12in. overlying 12in. of clay. Below this is a softer clay, with the water-table at 2ft. 6in. The soil appears to respond readily to applications of lime and potash. In its native state this country had a cover of trees, of which puriri predominated, and it is a feature of this country that the better class of land is to be expected where puriri was dominant. When the present owner took over the farm it was milking only 16 cows, but by carrying out a strenuous programme of topdressing and harrowing the fertility has been built up so that the farm eventually carried 28 cows.

Fencing and Drainage

Fencing consists mainly of barberry hedges, which give adequate shelter and do not take up excessive room. Hedges are trimmed back each April after growth has stopped. Some of the original shelter has been provided by macrocarpa trees, which are gradually being removed, as they shade crops and harbour birds, which can do extensive damage to young seedlings in the spring. In addition, macrocarpa trees, when they open up, tend to become draughty, and this is a factor in retarding growth.

Most of the paddocks are drained by 2½in. tiles placed 6in. below the hard clay, close to the water-table, and feeding into open drains.

Dairy Farm Management.

Prior to undertaking the growing of vegetables the owner milked 25 cows, which were put to the Aryshire bull so that they calved in June and July. The usual policy has been to buy in heifers for replacement purposes, provided the price was reasonable. If the price is much in excess of £10 per head, it is considered expedient to rear own stock replacements. A replacement of 25 to 30 per cent. has been an average yearly figure.

The most serious stock disease has been contagious abortion, though in one year there were cases of facial eczema. Cases of mastitis have been negligible.

Over a number of years the herd has averaged close on 300lb. of butterfat per cow.

Pastures and Supplements

Prior to rationing pastures were limed every two years with ½ ton per acre. Topdressing consisted of a yearly application of 3 to 4cwt. of superphosphate in the spring,

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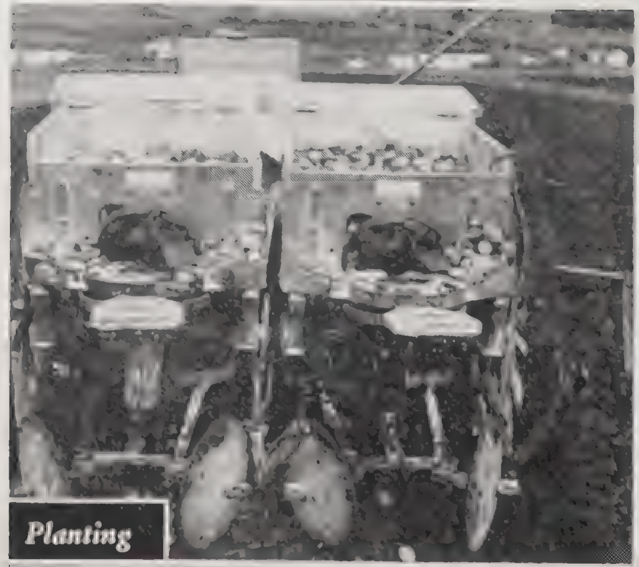

Planting

Digging

Bagging

ONIONS

Seeding

Transplanting

Harvesting

and 3 to 4cwt. bonedust, superphosphate, and potash in the autumn.

In the past about a third of the farm has been closed up in April and feed rationed out to the herd as cows came into production. Pastures are ryegrass and white clover dominant, with paspalum and cocksfoot present. Buttercup appears to be the dominant weed in this country, but liming and close grazing appear to keep it in check.

Six acres of hay have been saved annually, and 2½ to 3 tons per acre is an average yield on this farm, though in some years it has been necessary to buy in a little extra hay for feed. An acre of White Belgian carrots or a similar area of mangolds has normally been grown for feeding out in August, when feed supply is normally low. In view of the early calving normally experienced, the owner has not found it necessary to provide for supplementary feed during the summer, as the herd normally passes its peak of production in November.

Pig Management

One breeding sow is usually kept for every 8 cows milked. The Large White sow is crossed with the Berkshire boar and two litters of 8 pigs is the yearly average. The first litters, which usually come in about May or June, so that feeding coincides with the maximum herd production, are sold in September or October as store and buttermilk pigs, and a few held until January or February are sold as baconers. Of the November-December litters, half are sold in February as weaners and half in April as porkers.

One sack of bran is fed to the sow, up till the time of weaning, and a little meal is always added to the skim-milk. Carrots or mangolds are also fed to the pigs.

Market Garden Management.

Cropping Programme

Over the past few years the following crops have been grown on this farm:—Potatoes, onions, cabbage, carrots, tomatoes, peas, beans, and beetroot, most of which have been grown under contract to the Internal Marketing Division and trucked to the Department's depot at Pukekohe. Peas and beans have in the past been grown for use by Army camps, and tomatoes are grown for canning and sauce.

Approximately 20 acres of the farm are at present in crop and 14 acres in pasture. The remaining 2½ acres is made up of the homestead block and a small area of bush. The owner maintains that a farm of this size does not constitute an economic unit if dairying only is the practice. It is his opinion that 50 acres, carrying 35 cows, is a minimum one-man unit on this class of country. As a consequence, since 1938 5 acres of the farm have been set aside for growing potatoes and onions. This area has been maintained until, as a result of the appeal for vegetables, the area was increased to 10 acres in 1942, 15 acres in 1943, and 20 acres in 1944. By 1945 it is hoped to confine the whole of the area to market gardening. By this method of a gradual change-over from butterfat to vegetables no extra capital has been necessary in making the change. Table I gives an indication of the crops grown each year and of the reductions in milking cows occasioned by the yearly increase in the acreage of crops.

The acreages in the table do not necessarily correspond with the yearly figures mentioned previously, as double cropping has been practised in most cases.

Cultivation

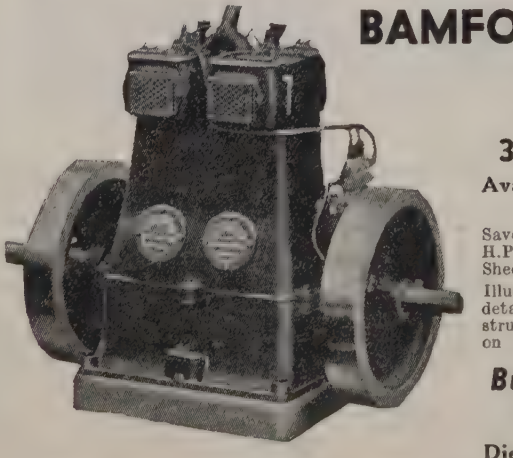
The first crop after grass is usually potatoes, and cultivation consists of skim ploughing in the autumn and, after a few weeks, when the turf has rotted sufficiently, discing to break it up. The ground is then deep ploughed to a depth of 9 to 12in. A harrowing of the furrow is usually all that is necessary to leave the ground fit for planting potatoes.

Seed-bed preparation requires extra cultivation. Crop residue is disced and cross disced until finally chopped up, and the ground is then ploughed, harrowed, and boarded (with the clod-crusher), and left to lie in this condition until the next rain. The next operation is to harrow, board, lime, and topdress with manure. A final harrowing and boarding generally results in a firm, fine seed-bed.

The power unit on this farm consists of 4 draught horses, which perform all cultivation work and seed-bed

TABLE I.

	Cropping.	Cows in Milk.
1938-39	.. 5 acres—4 acres potatoes, 1 acre onions.	28
1939-40	.. 5 " — " " , " "	23
1940-41	.. 5 " — " " , " "	28
1941-42	.. 5 " — " " , " "	26
1942-43	.. 15½ " —5 acres potatoes, 3 acres cabbage, 3 acres beans, 2 acres peas, 1 acre beetroot, 1 acre onions, ½ acre tomatoes.	20
1943-44	.. 21 " —7 acres potatoes, 5 acres cabbage, 4 acres onions, 2 acres tomatoes, 1 acre carrots, 2 acres beans.	14
1944-45	.. 32 " —3 acres cabbage (spring-planted, 1944), 5 acres cabbage (to be planted autumn, 1945), 5½ acres potatoes (harvested in spring, 1944), 4 acres potatoes (growing crops), ½ acre carrots (spring-harvested, 1944), 2 acres carrots (sown January), 1 acre beans (sown December), 4 acres onions (sown July, 1944), 3 acres tomatoes (planted November, 1944), 4 acres in green manure for ploughing under.	10



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The illustrations on opposite page of seeding and planting onions and of planting potatoes are from photographs by Sparrow Industrial Pictures.

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preparations. The owner intends purchasing a tractor in the near future, but maintains that the horse is more satisfactory for inter-row cultivation.

Cultivation equipment on the farm consists of a single mouldboard plough, 1 set tandem disc harrows, 1 set of heavy tine harrows, 1 set light harrows, 1 set chain harrows, and 1 board or clod-crusher. For inter-row cultivation two horse scarifiers and four wheel hoes are in use. Seeding is done with a single-row mechanical seeder.

Crop Rotations

Potatoes are usually the first crop out of grass. If this is a winter-planted crop for production of early potatoes, it is frequently followed by a summer-planted crop of potatoes harvested in the autumn. Onions followed by winter or spring cabbage constitute the second-year crop, and potatoes or tomatoes in the third year are followed by an autumn-sown green crop, which is ploughed in for green manure. Another type of rotation adopted is:—Out of lea into early potatoes, followed by carrots or tomatoes, for the first year. In the second year crops may be winter or spring cabbage followed by summer-planted potatoes, and in the third year onions are followed by winter or spring cabbage and the area then sown with a green manure crop. Peas and beans have no set place in the rotation, and fit in almost anywhere. Onions are frequently fitted into the rotation following winter-harvested carrots. Carrots sown after winter or spring cabbage or vice versa is a practice sometimes adopted. Carrot crops following each other is not a recommended practice.

Individual Crop Practice

Onions:

Second-crop ground is preferred for onions, as it is fairly free of fibre, which interferes with wheel-hoeing work. Ground previously cropped also tends to set hard and firm, a condition which also favours onion growth.

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Pukekohe Longkeeper variety is sown with the mechanical seeder in 12in. rows, usually from July to August. The rate of seeding is 5lb. per acre, on ground which has had a previous application of 1 ton of lime and 15cwt. to 1 ton of finely-ground bonedust. As soon as the seed germinates and rows can be seen the crop is cultivated continuously with wheel hoes until excessive bulb growth prohibits further working.

Onions are not thinned, but require from three to four hand weedings. The crop is harvested usually in February, or late January at the earliest. This is done with a special arrangement which is attached to the wheel hoe, which, when pushed through the rows, cuts the onion roots and lifts the bulbs out of the ground. Onions are then left on the ground to dry out. Depending on weather conditions and the thickness of the necks, it may be two to three weeks before they are in a fit condition to bag and store.

A feature of this particular farm is the storage house used for storing onions through to October, when the advantage of an increased price is obtained. Very little loss results from decomposition, the estimate being approximately 2 per cent. Loss of weight through storage is approximately 14 per cent., the total loss of 16 per cent. being small when compared with the £12 increase in the price for the October-delivered crop. The storage house is constructed of unlined weatherboard, and is of a lean-to type, dropping from 9ft. to 7ft. in height. The flooring is of 9in. boards with 1in. spacing, and raised 3ft. from ground level. The floor space is 19ft. x 15ft., and the shed will hold up to 30 tons of onions. Onions are stored loose in the shed, and the tops are not removed until the onions are bagged up ready for disposal.

Cabbage:

Autumn-planted cabbage is seeded in the nursery in open beds during February, and is planted out in March or April. The variety preferred for this time of the year is Henderson's Early Market, the next preference being the variety Golden Acre. The crop is harvested usually from June to August. Charleston Wakefield variety is preferred for the spring-planted cabbage, though Golden Acre and Springtide are also grown. Spring cabbage seed is sown in the nursery beds late in April, planted out during July and August, and harvested from October to December.

Crops planted in the autumn receive 17cwt. blood and bone and superphosphate per acre in a ratio of 2 to 1; 3cwt. of limonite is also added. Spring-planted crops receive 10cwt. of the above mixture, although the quantity applied varies according to the quantity of manure used on the previous crop. If the previous crop has had a liberal application, the cabbage may not receive its full quota. Manure is applied through the potato planter, in 30in. rows, and plants are set out on the ridges. Spring-planted crops are spaced 9 to 12in. apart, and autumn plantings are approximately 15in. apart. The cabbage crop is usually hand hoed once, cultivated with the horse scarifier, and finally moulded up with the moulder.

Crop of Early Market cabbage ready for harvesting.
[Sparrow Industrial Pictures photo.

The crop is harvested when fully mature, the owner being prepared to lose a small proportion of the crop through over-maturity, rather than lose weight through harvesting an immature crop. Produce is cut and bagged and trucked through to the Internal Marketing Department's depot at Pukekohe.

Potatoes:

The early crop, planted out in June and July, is usually harvested during November and December. A portion of this crop is harvested in November at a more immature stage than normal and the tubers are used for planting in December for production of the "autumn" crop, which is usually harvested in April. Most of the produce of this crop is used for seed, being commonly known as "autumn" seed, and is planted out in the following June and July for production of the following season's early crop. In this way the supply of seed is assured for each season's early potato crop.

A practice sometimes adopted in this district is to retain the sound discarded seed left over from the June-July planting for setting out on a portion of the ground from which the early crop was harvested in November. The seed used for this crop is popularly known as "kept-over" or "carry-over" seed, and, as it is well sprouted, it usually comes away quickly. The crop is harvested during February and March and is regarded merely as a catch crop. Seed saved from this crop, however, is not suitable for further plantings. "Kept-over" seed has the advantage of being well sprouted and is usually more certain than the "autumn" crop. It is also in the ground for a relatively short period.

With the exception of the "kept-over" crop, it is a common practice throughout the Pukekohe district to cut the larger seed potatoes prior to planting, and in the case of small seed a small portion is usually chipped from the tuber. Growers maintain

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that this operation hastens the germination of the seed and makes the growth of the crop more uniform.

The Northern Star or Gamekeeper variety is preferred for the early crop, as it gives a high yield, and, although the sample frequently contains a relatively high proportion of small tubers, it is an early potato and most of the crop is usually marketable. Arran Chief is the popular "autumn" crop variety. It produces a more even sample with fewer small tubers than Gamekeeper, and at this time of the season the market requirement is for an evenly-graded line.

The potato crop is sown with the potato planter in 30in. rows at the rate of 1 ton per acre for small seed. The following manurial mixture is applied at the rate of 1 ton per acre:—8cwt. bonedust, 2cwt. muriate of potash, 1cwt. sulphate of ammonia, 5cwt. superphosphate, and 4cwt. blood and bone. After-cultivation consists of hand hoeing and horse scarifying and a good moulding up when the leaves have practically met across the rows.

The crop is harvested with the potato digger, and is usually sold immediately.

Carrots:

Carrots can be sown from August to March, and, if necessary, the main crop can normally be held through and harvested in September. Carrots are sown in 12in. rows at 3lb. per acre on ground that has previously been topdressed with 15cwt. to 1 ton of finely-ground bonedust. Carrots are thinned from 2in. to 3in. apart and usually hand weeded twice. Wheel hoes are used for inter-row cultivation from the time the seed is through the ground until there is sufficient leaf growth to smother any further weed growth. The Early Crop and Chantenay varieties are preferred for the spring crop and Chantenay for the main crop.

A young crop of carrots.

The spring-sown crop is harvested from November to January, and the summer-planted crop can be harvested in the autumn and winter, or, if required, may be held through for September harvesting. The crop is pulled or dug by hand, tops trimmed to ½in., and the carrots bagged for delivery to Pukekohe. Most of the crop is delivered as first grade, there being only about 5 per cent. of seconds. This, of course, is dependent on the thoroughness with which the thinning has been done and on the season.

Tomatoes:

Australian Dwarf and Tatura Dwarf are the varieties of tomato grown for canning purposes.

Tomatoes are grown in 36in. rows, with plants 30in. apart. They are planted in line across the rows, so that inter-row cultivation can be carried out both ways.

The following manurial mixture at 30cwt. per acre is applied through the potato planter:—10cwt. blood and bone, 5cwt. dried blood, 5cwt. superphosphate, 2cwt. potash, and 4cwt. limonite.

Plants are set out from October to December, and are usually watered in. Subsequent cultivation with the horse-drawn scarifier is carried out across, as well as down, the rows. The fruit commences to ripen in late January, and under favourable conditions the harvesting season may extend through to April. The crop is hand picked and packed into "Wattie" boxes for disposal to canning and sauce factories.

Peas and Beans:

Peas and beans have been grown in the past for local Army supply.

Peas of the Greenfeast variety are grown in 14in. rows and seeded with the mechanical seeder at 2 bushels per acre. The Black Valentine variety of beans is grown when available, and is seeded mechanically in 18in. rows at 1 bushel per acre. If runner beans are grown, they are sown in double rows 18in. apart with 36in. between the pairs. Beans are thinned to 3in. apart.

Where peas and beans are grown after potatoes no manure is used, as it is considered that there is sufficient already in the soil. Otherwise about half a ton of potato manure per acre is broadcast prior to seeding.

Peas are sown from September to December and harvested from December to February.

Beans are usually sown from December to January and harvested in February, March, and April.

Beetroot:

Beetroot is sown in 14in. rows a 5lb. per acre in November. The crop is usually ready to harvest in March and April. The owner maintains tha this crop requires potash in the manurial mixture, which is much the

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same as is used for potatoes. The crop is harvested by hand, the tops trimmed, and the produce bagged for disposal.

Labour Requirements

Permanent labour consists of a foreman and two other male workers. For about 6 months of the year Maori casual labour is employed for thinning, weeding, and harvesting, an average of four female workers usually being sufficient.

Disease Control

A rigorous programme of spraying is necessary for the control of insect damage and crop diseases. The warm, humid climate of this district encourages fungous diseases.

The most important diseases, with their various methods of control, are as follows:—

(a) Late Blight of Potatoes and Tomatoes:

Late blight is very marked in this district, and crops can become badly infected almost overnight. It has been necessary for growers to harvest their potato crops at an earlier stage than usual in some seasons in an effort to harvest the crop before the tubers become infected.

Blight of potatoes is controlled by spraying the crop with a mixture of 4lb. bluestone, 5lb. washing soda, and 40 gallons water every 9 or 10 days, with at least five consecutive sprays. Tomatoes are sprayed every 7 or 8 days with Bordeaux mixture (4lb. bluestone, 4lb. hydrated lime, 40 gallons of water). As the fruit begins to form 5lb. arsenate of lead paste per 100 gals. water is added to the spray mixture for the control of the tomato caterpillar.

(b) White Butterfly and Diamond-backed Moth:

Cabbage must be sprayed regularly from January to May for the control of white butterfly and diamond-backed moth. Lead arsenate and nicotine sulphate are used in the following proportions: 4lb. lead arsenate (powder) per 100 gals. water plus 1 pint nicotine sulphate per 40 gals. water. Soft soap is used as a spreader. Crops after planting out are sprayed every 9 or 10 days. Seedlings in the nursery beds are sprayed every 2 to 3 days with nicotine sulphate until planted out.

(c) Carrot Aphis:

During seasons when aphids are troublesome spring crops of carrots are sprayed with nicotine sulphate at a concentration of one teaspoonful per gallon of water.

Spraying.

(d) Downy Mildew:

Downy mildew is controlled on nursery cabbage plants by spraying regularly with lime sulphur. The disease is most noticeable during warm, humid weather.

Crop Yields

The following is a conservative estimate of crop yields on this farm during the last three or four seasons:

Crop.	Tons per acre
Potatoes (early crop)	7-8
Potatoes (autumn crop)	4-5
Carrots (main crop)	12-18
Carrots (spring crop)	6-10
Onions	10-15
Cabbage	6-10
Tomatoes	12-15

Farm Budget

As may be expected, the change-over of farm policy has not resulted in an immediate increase of returns. When the owner first considered a change to market gardening he was prepared to suffer a loss on the first year's work, realising that increased returns could not be expected until the second or third year of cropping.

The following table shows income and expenditure over the three years 1941-42, 1942-43, 1943-44:—

TABLE II.

1941-42.

	£
Income	1,151
Expenditure	607
Surplus	£544

1942-43.

	£
Income	1,302
Expenditure	1,035
Surplus	267
+ Onions on hand and containers on hand	294
	£561

1943-44.

	£
Income	1,805
Expenditure	1,550
Surplus	255
+ Onions on hand and containers on hand	517
	£772

The figures for 1944-45 are not yet available, but returns already to hand indicate that the surplus from this year's cropping is likely to show a material increase. It is the intention of the owner to invest as much of this surplus as is practicable in such items as a farm tractor and additional cultivation equipment necessitated by the increased area now in crop.

If the figures are further analysed (Tables III and IV), the income items will give an idea of the increase in gross returns from cropping, together with the decrease of butterfat returns occasioned by the necessary reduction in herd numbers. The expenditure columns, on the other hand, indicate a substantial increase in labour costs, sprays, seeds and manures, vegetable containers, etc. Tables III and IV analyse income and expenditure over the three years:—

TABLE III—INCOME.

1941-42.	Returns from prev. year's cropping.	1941-42 returns.	
		£	
Butterfat (26 cows) ..		526	
Pigs		91	
Cull dairy cows		17	£634
1941-42 Plantings and Sowings.	£	£	
4 ac. potatoes ..		450	
1 ac. onions ..	36	24	
Seed potatoes ..	7		
	£43	£474	£517
Total income			£1151
Assets on hand			Nil

1942-43.	Returns from prev. year's cropping.	1942-43 returns.	
		£	
Butterfat (20 cows) ..		404	
Pigs		75	
Cull dairy cows		16	£495
1942-43 Plantings and Sowings.	£		
5 ac. potatoes .		318	
Seed potatoes .	37		
1 ac. onions ..	248	48	
3 ac. cabbage .		51	
½ ac. tomatoes		36	
3 ac. beans ..		17	
2 ac. peas ..		52	
1 ac. beetroot .		—	
	£285	£522	£807
Total income			£1302
Assets on hand—onions			74
Bags and containers			220
			£1596

1943-44.	Returns from prev. year's cropping.	1943-44 returns.	
		£	
Butterfat (14 cows) ..		278	
Pigs		58	
Cull dairy cows		17	£353
1943-44 Plantings and Sowings.	£		
7 ac. potatoes .		627	
Seed potatoes .	32		
4 ac. onions ..	74	81	
5 ac. cabbage .	95	81	
2 ac. tomatoes		166	
2 ac. beans ..	56	102	
1 ac. carrots ..			
Beetroot ..	138		
	£395	£1057	£1452
Total income			£1805
Assets on hand—onions			317
Bags and containers			200
			£2322

1944-45 returns were as follows: 4 ac. onions, £317; 5 ac. cabbage, £425; 1 ac. carrots, £223.

TABLE IV—EXPENDITURE.

	1941-42. £	1942-43. £	1943-44. £
Wages	97	262	656
Rent, insurance, rates ..	108	115	139
Stock food	34	45	39
Sprays, seeds, and manures	78	251	413
Repairs and maintenance ..	108	90	128
Cases, bags, and twine ..	24	88	58
Sundry expenses	—	11	13
Livestock purchases ..	117	109	—
Freight and cartage ..	11	34	74
Car expenses	30	30	30
Total	£607	£1,035	£1,550
Surplus	£544	£561	£772

On the income side of the balance sheet the column "Returns from previous year's cropping" includes money that has come to hand during the current year but belonging to crops grown during the previous year. For example, onions are harvested normally during February and March, but only a small portion of the crop is sold off the paddock during the current year, the bulk being held through to August and September. Most of the onion ret rns, therefore, will not come to hand until the fol-

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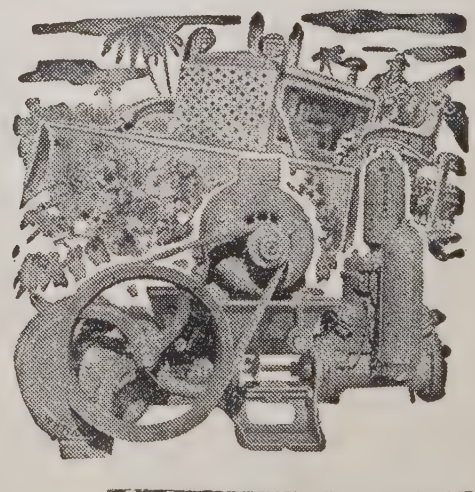

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Dusting.

lowing financial year. This is understandable when it is realised that the financial year does not necessarily correspond with the cropping year. Autumn-planted cabbage, main crop carrots, and beetroot also come into this category. An additional column in the 1943-44 income includes the returns for the 1943-44 cropping which have not come to hand until the following year.

There is a very noticeable increase in expenditure on wages, sprays, seeds and manures, and containers. The freight and cartage bill also shows an increase each year, as more produce is being delivered from the farm. The apparently high figure of £109 for livestock purchases in 1942-43, especially in view of a reduction in dairy herd numbers, is due to the purchase of additional horses for cultivation work.

In the above budget no account has been taken of such items as "interest on live and dead stock," "wages of management," "depreciation of plant and buildings," all of which should be included to complete the picture. The figures given are cash book entries.

Table V shows gross returns per acre of the various crops:—

TABLE V.

GROSS RETURNS FROM CROPS GROWN FROM 1941 TO 1944.

1941-42.	Total Returns. £	Returns per Acre. £	1942-43.	Total Returns. £	Returns per Acre. £	1943-44.	Total Returns. £	Returns per Acre. £
4 ac. potatoes ..	450	112	5 ac. potatoes .	318	64	7 ac. potatoes	627	90
1 ac. onions ..	272	272	1 ac. onions ..	122	122	4 ac. onions .	398	100
			3 ac. cabbage .	146	49	5 ac. cabbage	506	101
			½ ac. tomatoes	36	72	2 ac. tomatoes	166	83
			3 ac. beans ..	73	24	2 ac. beans ..	102	51
			2 ac. peas ..	52	26	1 ac. carrots	223	223
			1 ac. beetroot .	138	138			

Over the three years the returns per acre of potatoes have varied from £64 to £112. Onions have shown a larger variation, the first year's returns being by far the best. The second year's crop was badly infected with mildew, which lowered the yield, and the third year's returns were also small, due to the dry season and consequent lower yield. The figures for beans in the 1942-43 season do not present a true picture, as the crop was not harvested for consumption and the returns are made up from seed harvested from 1 acre of the crop together with compensation received for the other 2 acres. Cabbage returns show a variation, due to higher prices being secured for cabbage grown under contract to the Internal Marketing Department in the 1943-44 season.

Market Gardening Future

When asked his opinion about the future of market gardening in New Zealand the owner said that an increased market seemed assured for potatoes, onions, and produce suitable for canning, such as peas, beans, and tomatoes, but he did not consider that the present demand for cabbage and carrots would continue beyond that of local city markets. He appreciates the fact that it has been a wartime demand. It is hoped that "quick freeze," on the other hand, will open up a market for vegetables suitable for this new process.

The owner is definitely in favour of a controlled system of market gardening under which contract areas of vegetables are allocated on a pro rata basis. He maintains that the ideal set-up would be a controlling body of growers and processers working together on a co-operative basis.

Acknowledgments

Thanks are expressed to the Soil Survey Division of the Department of Scientific and Industrial Research for data in the soil map and to the Lands and Survey Department for the drawing of maps.

◆

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Pig Industry in Wartime

— And its Future Markets

NO primary industry has been subjected to more alterations in policy during the war than the pig industry. Most factors necessitating these changes ceased with the war, or are about to cease, and with a tendency towards pre-war production now apparent this review of the industry during the war and the outlook for the future by H. M. Peirson, Superintendent of the Pig Industry, Wellington, is timely and should be of assistance to pig producers in readjusting themselves to altered markets.

WITH the cessation of hostilities in the Pacific and the termination of our contracts for pig-meats with the United States Joint Purchasing Board there is evidence of another change in the pig industry. While during the war period the nature of our contracts with the United States Joint Purchasing Board necessitated the production of bacon pigs, this was achieved only by a constant readjusting of prices and weights and by regulations covering the sale of pork for local consumption. However, these measures did not result in an increase in the production of pig-meat, but only maintained baconer production to the 1938 level, 400,000 carcasses. This was done at the expense of porker production, which fell from 650,000 in 1938 to 200,000 carcasses in 1945.

The indications are that while some farmers may have turned over to bacon production, the great majority habitually producing porkers ceased to produce pigs. This is borne out by the fact that the sow population fell from 110,000 in 1938 to 77,000 in 1944.

There is no doubt that the regulations prohibiting the sale of pork locally helped to maintain the flow of heavier pigs, but they would appear also to have been the deciding factor in the reduction of breeding sows on farms.

With the lifting of the restrictions on the sale of pork for local consumption there will probably be a tendency towards pre-war production. The sow population will gradually increase, because pork is the type of production generally favoured and because it suits best the average dairy farm conditions and a basic feed supply mainly composed of skim-milk and whey. It should tend towards not only increasing the sow population, but a greater use being made of sows, to

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the extent that annual production per sow will rise from 8.8, as at present, to the 1941 level of 10.5.

When War Began

It can be said that no primary industry has been subjected to more alteration in policy during the war years than the pig industry. At the commencement of the war the United Kingdom Government agreed to purchase all New Zealand's exportable surplus of pig-meats. Then came a request from the Imperial Government that only bacon carcasses of 121lb. to 180lb. would be accepted for shipment. This created a real problem for the men who had hitherto concentrated on the production of porkers. When the peculiarities of New Zealand's production were pointed out to the Home authorities they readily gave the concession of including carcasses of 101lb. to 120lb., and the position was eased considerably.

The next request of the United Kingdom Government was that only 75 per cent. by weight was required as bacon carcasses, 101lb. to 180lb., the balance—25 per cent.—to be made up as porkers and choppers. This later was amended to exclude chopper pigs, and finally, early in 1940, a concession was made that porkers of 60lb. to 100lb. would be acceptable. This last concession removed, for the time being at any rate, the last vestige of restriction, and gave an opportunity to market all pigs born.

Although the concessions were made, it must be borne in mind that the United Kingdom Government still preferred bacon pigs, and the removal of the restrictions on pork in no way modified our obligation to supply bacon. The switch-over from pork to bacon produced very gratifying results, for the kill of baconer pigs for 1940 had increased to 600,000 carcasses, as against 388,000 in 1939. This was a meritorious effort on the part of New Zealand producers, for there is no doubt that freedom to kill porkers is essential to the expansion of the industry, and New Zealand had been asked to make that expansion in a way that was foreign to her usual methods.

Shipping Crisis

However, in March, 1941, a crisis arose because of shipping difficulties. Through sinkings and the determination of Great Britain to divert all available shipping into the most effective war-winning channels, Great Britain was unable to lift our normal export of meat, and in fact was unable to say how much could be lifted in the future.

Pork for export trade must be raised under hygienic conditions.

Owing to decreased shipping space it was generally held that although meat might pile up in New Zealand and future shipments become quite indefinite, baconers would continue to be among the class of meat most required by Great Britain. Then came a most disturbing cable from the Imperial Government. She informed New Zealand that it would be impossible to take delivery of any further shipments of baconers. Due to extensive losses in shipping and Admiralty requirements, our insulated space had been seriously lessened, and there was a tendency to make better use of it by greater reliance on sources of supply nearer to Great Britain than New Zealand or Australia.

At this time the Government was in the process of making a big drive for increased production, particularly of pig-meat, and although the cutting-off of our markets proved to be only temporary, it very naturally was not reassuring as far as future production and expansion were concerned.

Producers were advised of the changed policy and the necessity of curtailing production to the narrow margin of local requirements. This caused considerable inconvenience to farmers, but the position improved with the better news that 5,000 tons of baconers would be required by December, 1941, and normality was restored by a final agreement that Great Britain would purchase 11,000 tons of bacon and include porkers with other classes of meat for export.

Big Demand Again

Continuous readjustments for pig-producers were necessary in 1941. These unavoidable changes were caused solely by the development of the war situation. With the spread of the war to the Pacific a reversal of policy was again necessary, and the industry was advised that there was once more an urgent and very substantial demand for pig-meats, particularly of bacon; but the damage had been done—some producers had gone out of pigs; others had withheld sows from the boar, with the result that production fell in 1942 to 960,000 carcasses, and to the low level of 767,000 in 1943.

Recovery was difficult; there had been a general shortage of labour on farms, and unfavourable seasons had been experienced over the previous two years in many parts of New Zealand favourable to pig production, which led to a limitation of winter feed supplies, with a resultant in-

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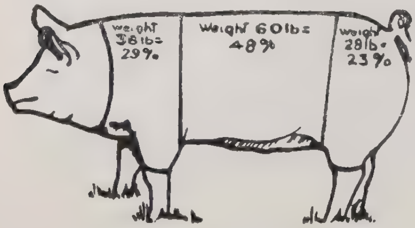
ability on the part of producers to carry the usual supply of store pigs through the winter.

To arrest this serious decline in pig production an effort was made early in 1943 to import stock feeds from Australia. Unfortunately, owing to shipping difficulties these essential feed supplies arrived too late to affect the position, and production fell still further, to 740,000 carcasses in 1944. To assist the supply of pig-meats to the Allied armed forces in the Pacific a ceiling was placed on the local consumption of bacon. In addition, the prohibition on the sale of fresh, frozen, and cooked pork was instituted, and it was only by enforcing the latter restrictions on the civilian population that New Zealand was able to keep faith with the contracts made with the United States Joint Purchasing Board, whose business it was to provision all the fighting forces in the Pacific area.



Relative weight of the different portions of a high-grade carcass.

There is little doubt that the falling-off in production, which shows a further decline for 1945 to 680,000 carcasses, has been brought about by a succession of unavoidable circumstances—the constantly-changing policy to meet the requirements of overseas markets, the lack of labour on farms, the change-over from butter to cheese and back again to butter, drought periods of 1942-43, inability to obtain imported stock feeds in 1944, and the serious reduction in the number of breeding sows kept.

In spite of all these obstacles, however, New Zealand has been able to maintain production of bacon pigs in sufficient quantities to honour contracts made to the United States Joint Purchasing Board. So great has been this concentrated effort that of the slaughterings for the year ended September, 680,000 carcasses, no less than 490,000 were of bacon weight. This was 60,000 above any pre-war standard, and was exceeded only in 1940, when baconers reached over 600,000 in a total kill of 873,000 pigs.

Length for weight is all-important.

Whither Now?

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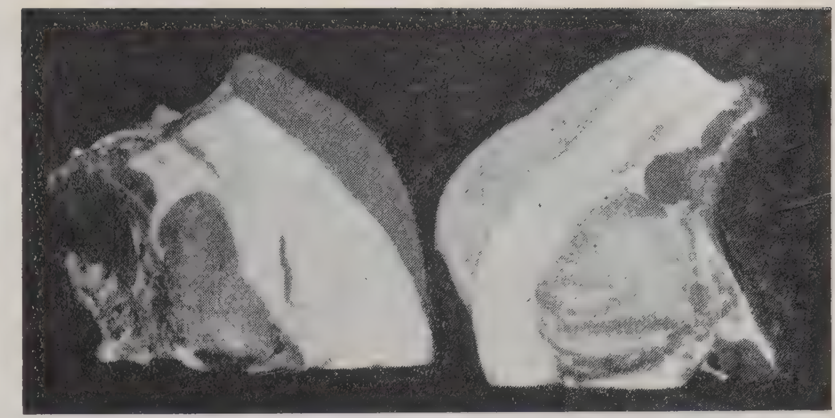
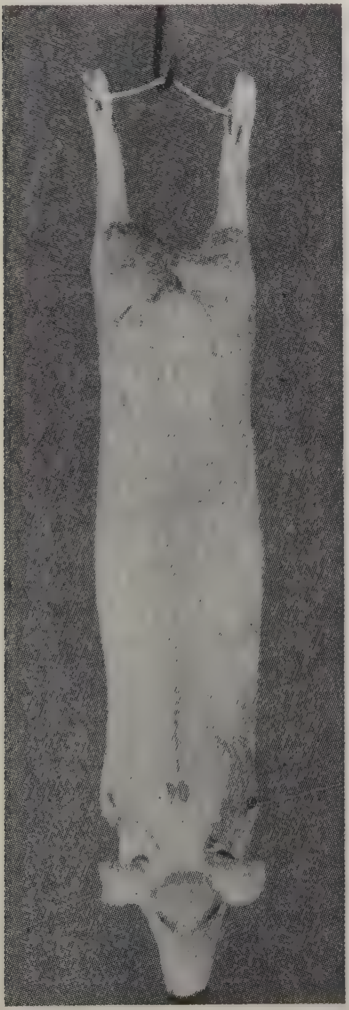
mination of our contracts for pig-meats with the United States Joint Purchasing Board on December 10, the pig industry now faces another adjustment.

Assuming that pig-meat can be produced and exported without any restrictions regarding the kind of pig-meat (pork or bacon)) being acceptable to the United Kingdom, an increase in the sow population will undoubtedly take place fairly rapidly, and it is anticipated that there should be not less than 85,000 on hand in January, 1946, increasing to at least 100,000 sows by January, 1947. If this can be achieved, production for the year ending September, 1948, should be back to normal, on the basis of the 1938 figures of 660,000 porkers and 440,000 baconers.

When it was first announced that the majority of our pigs would have to be carried to bacon carcass weights there was created for the pig producer a problem that no other stock producer had to face. Not only had he to provide more pig feed than was usually required, and to do this under unfavourable conditions which made pig production difficult and uncertain, but the possibility of obtaining the usual supplies of imported stock food upon which he relied for autumn and winter feeding had become practically impossible.



Fullness of meat is essential to the trade. The comparison is obvious.



The ideal porker.

Now with the possibility of once again establishing trading relations with Great Britain for pig-meats, there should be incentive for increasing the breeding stock. With the continuance of the £5 per acre crop subsidy scheme for 1946, winter feed supplies are assured. In the meantime where are the extra breeding sows to come from? It is obvious that the first increase will have to be selected from the bacon pens, replacing these sows with more suitable breeding stock as they become available. In so doing it must be remembered that while quantity is of paramount importance at the present time, quality must not be lost sight of. Having built up a reputation in the United Kingdom for quality porker carcasses, this should not be jeopardised in favour of any scheme for rapid expansion.

Success in any form of business is founded on the ability to produce an article that satisfies the market. It must be obvious therefore that the demand for pig-meats either for local consumption or export can be satisfactorily met only by a supply of pigs of the quality demanded. The trade generally will accept porkers between 60lb. and 120lb., with a distinct preference for carcasses between 60lb. and 90lb. The same applies to bacon pigs, which are now acceptable for export between 121lb. and 180lb. Here again the preference is for carcasses between 135lb. and 160lb. Overweight and fat pigs are not required for any market. It is time to realise that public taste has changed and is becoming more fastidious. Taking the consumer right throughout New Zealand and Great Britain, the popular demand is undoubtedly for leaner meat. To quote an eminent Home authority:—

> It cannot be too strongly emphasised that in competition with other food industries, the pig industry can play its full part in meeting public demands only if the retail trade is supplied with raw material which suits public taste and preference. The consumers are the jury whose favourable verdict must be sought—a verdict from which there is no appeal.

In normal times New Zealand has an exportable surplus of some 500,000 to 600,000 carcasses. These have to meet world competition. When again setting our house in order let us not forget that breeding, feeding, and housing play an important part in holding our place as producers of high-quality products.

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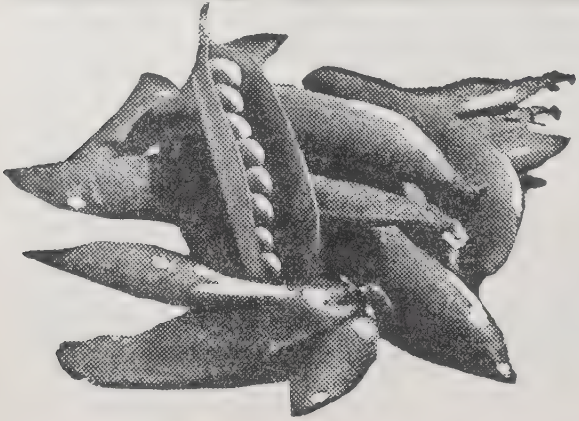

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Erosion in Moutere Hills Orchards

SOIL, climatic, and topographical conditions were conducive to erosion in the Moutere Hills long before orchardists settled there. Subsequent cultivation methods have accelerated the movement of topsoil, and even subsoil, from the higher or steeper slopes, until orchardists are presented with a serious problem. Factors encouraging erosion in the district are discussed in this article by Sir Theodore Rigg, Cawthron Institute, Nelson, and N. J. Adamson, District Superintendent, Horticulture Division, Nelson, and methods of combating it suggested.

A CASUAL inspection of many orchards on the Moutere Hills reveals serious erosion of soil from the higher or steeper slopes, with an ever-increasing accumulation of silt and sand in the bottom of the valleys or lower slopes of the orchard. In many cases the soil which was very thin at time of planting has been completely denuded from the steeper slopes as a result of heavy rains and the mechanical movement of soil downhill by cultivating implements. In the worst cases of erosion not only has the topsoil disappeared, but even the subsoil is being eroded and is being deposited on top of good soil in the lower parts of the orchard.

As a result of denudation of the soil, trees on steeper slopes are rapidly deteriorating in both growth and productivity. Trees at the bottom of valleys, on the other hand, are submerged in silt and sand, frequently up to the fork of the trees. This finally results in waterlogging, lack of aeration of the root system, and an increasing susceptibility to root diseases.

Factors Effecting Erosion

Judging by the description of Moutere Hills soil given by F. G. Tuckett, principal surveyor of the New Zealand Land Company, in 1846, erosion of soil had been in progress many years prior to the arrival of the white man. Tuckett stated that the soil of the Moutere Hills consisted of 4in. of clay and sand resting on a stiff ochre clay. He described the vegetation of those days as consisting of stunted fern on the ridges with flax and toe-toe in the valleys. It seems probable that fire prior to the advent of the English settlers had destroyed the original flora (probably beech forest) and had laid the topsoil open to erosion.

Gullying in long shallow depression with gradual fall.

Gullying in centre of rows on moderate slope caused by continual washing of soil; subsoil now exposed.

The planting of orchards on the Moutere Hills and the continuous cultivation of the soil for over 30 years have greatly accelerated the erosive forces which were in evidence long before the orchardist settled there.

The severity of erosion affecting orchards is dependent on a number of factors, the most important of which may be enumerated as follows:—

1. **Nature of Moutere Hills Soil:** It is a silt loam containing only a small supply of organic matter. Its texture and its lack of organic matter make it peculiarly susceptible to erosion by water.

2. **Intensity of Rainfall:** Nelson frequently experiences very heavy rains during the summer when the orchards are clean cultivated. Under these conditions soil is easily transported downhill by any prolonged rain.

3. **Degree of Slope:** American authorities state that slopes over 10 per cent. (1 in 10) should not be cultivated. Many slopes in Moutere Hills orchards exceed this slope percentage and as a result erosion is very pronounced.

Data prepared in U.S.A. suggest that the loss of soil per acre under clean cultivation on a 10 per cent. slope will not be less than 20 tons of soil per acre annually and may be much higher, dependent on the intensity of the rainfall and nature of the soil. Assuming such an annual loss from Moutere Hills orchards, the topsoil to a depth of 4½in. would have been completely eroded in 25 years. On slopes steeper than 1 in 10 the rate of erosion naturally would be much higher.

4. **Length of Slope:** The shorter the slope exposed to rain, the less serious will be the movement of soil. Under similar conditions in U.S.A., a 10 per cent. slope 420ft. long showed a 50 per cent. increase in erosion over one 72ft. long.

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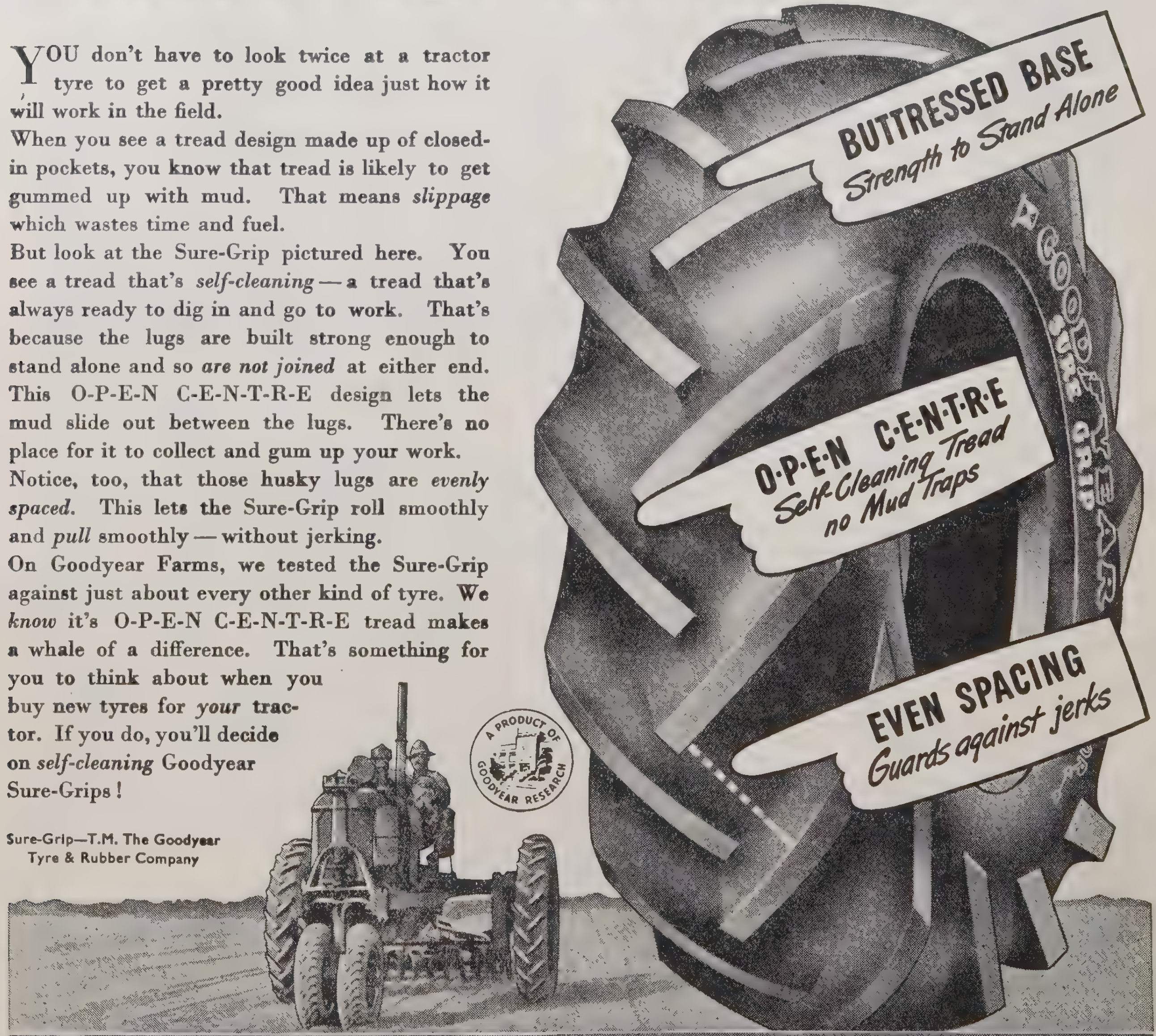

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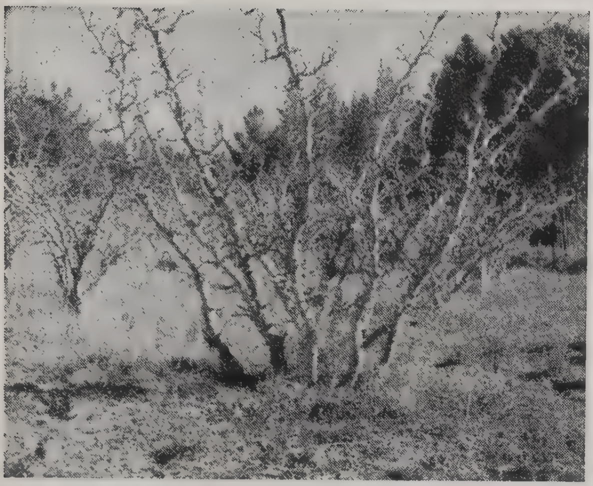
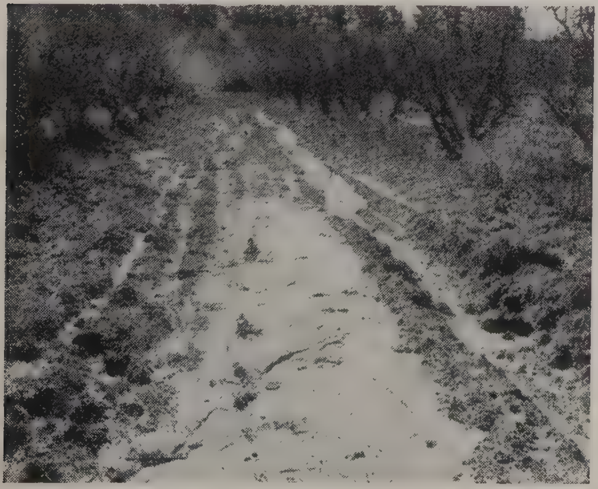


Silting at the mouth of a shallow depression.

5. **Cultivation:** The system of clean cultivation during the summer months practised in Nelson orchards exposes the soil to erosion during periods of heavy rain. While it is generally recognised that clean cultivation is desirable to maintain optimum moisture conditions in the soil, some amelioration from erosion might result from the conduct of cultivation across the slope—not parallel to the slope—and by a greater reliance on the plough and rigid-tine cultivator in preference to discs. The objective in cultivation should be to produce a tilth containing both fine particles and larger lumps which will impede erosion. The use of discs alone tends to create a fine mulch which moves easily under high-rainfall conditions.

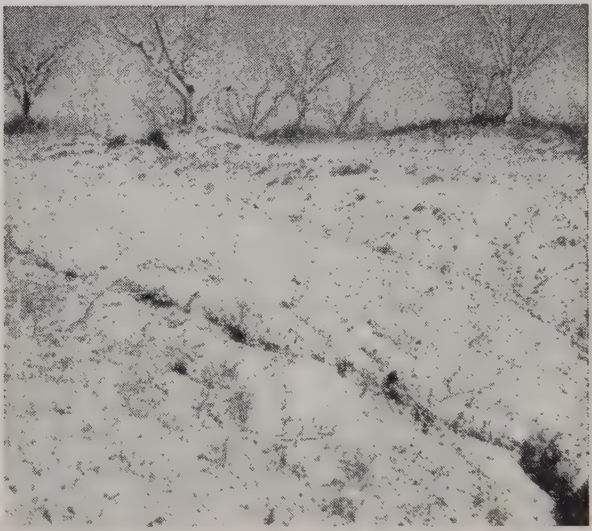
The banking of trees by ploughing-on should be beneficial on uniform slopes in preventing a too rapid run-off of water with its attendant soil erosion. A common sight on almost every orchard, even on gentle slopes, is the displacement of soil from the highest row of trees. In many cases the exposure of subsoil is due to the mechanical movement of soil as a result of ploughing, discing, and cultivation. In order to minimise the downward creep of soil, cultivation should be done as much as possible across the slopes—not up and down. A reversible hill-side plough for throwing the furrow slice uphill should prove helpful in preventing the downward movement of soil.



Silt deposited on flat land at bottom of slope shown in photograph at right (above).

6. **Use of Cover Crops:** In view of the low content of organic matter in Moutere Hills soil, it is very desirable that the humus content should be raised. One method of achieving this object is the growing of cover crops for ploughing in during August or September. Blue lupins, by virtue of their ability to use atmospheric nitrogen, are particularly valuable for this purpose, and not only improve the organic matter content of the soil, but provide a relatively large amount of nitrogenous compounds which become available to the trees in the summer. The use of cover crops, particularly if sown in January, quickly affords a shelter to the ground against driving rain, and holds the soil in the winter. Mulching around trees on higher slopes would likewise have a beneficial effect, not only in conserving the soil but in providing plant foods for the trees.

7. **Strip Cropping:** On the higher slopes of many Moutere Hills orchards the use of rye and clover for grassing down alternate strips for a period of 2 or 3 years should be considered. This would be helpful in arresting erosion of soil, but might entail more hand digging around the trees. On very steep slopes the sowing of a permanent cover between the rows, confining cultivation to hand digging around the trees, might be recommended.



Severe sheet erosion at top of steep slope, leaving trees on mounds.

8. **Provision of Water-ways:** Where drainage water tends to take well-defined channels, frequently causing both gully and sheet erosion, it would appear desirable to grass down the lower part of main drainage channels and to divert the run-off from adjacent slopes as much as possible over this protected surface.

9. **Planting New Orchards:** Orchards should not be planted on steep slopes. Even where the grade is not greater than 4 per cent. experience in U.S.A. has demonstrated the desirability of planting on contour lines and arranging contour banks at intervals up the slope. Attention must be given to drainage outlets from contour lines and the provision of water-ways to take surplus water.

Summary

1. A great deal of soil erosion has taken place on the higher slopes of Moutere Hills orchards. This has resulted from the downward movement of soil with cultivating implements and by the action of heavy rains at times when the surface soil was loose and unprotected. In many cases the steepness of slopes renders them unsuitable for orchard use.

2. The Moutere Hills soil by reason of its texture (silt loam) and its low content of organic matter is very susceptible to water erosion.

3. The following recommendations are made to minimise soil erosion:—

(a) Bank the trees by ploughing-on across the lines of slope.

(b) Use plough and cultivators with a view to obtaining a tilth containing both fine and coarse particles.

(c) Sow cover crops, particularly blue lupins, with a view to protecting the soil from driving rain and for improving the organic matter and plant food content of the soil. Immediately after sowing the cover crop give each row a stroke with the cultivator to obtain a series of slight ridges along the lines of contour.

(d) On higher slopes sow grass and clover in alternate rows and leave down for 2 or 3 years before ploughing.

(e) On very steep slopes sow every row with grass and clover, confining cultivation to hand digging around the trees.

(f) Arrange protected water-ways on lower part of the orchard to take drainage water from higher slopes, using tile drains and grass for this purpose.

(g) In new plantings care should be exercised in the selection of land where the slopes do not exceed 10 per cent. Plantings should be made on contour lines, with suitable banks at intervals on the slope to prevent serious soil erosion.

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A twelve-hour record here is 225¾lb. These quantities would, of course, be discounted for the average picker, while conditions vary so much that it would be difficult to arrive at mean figures.

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FARMING IN NEW ZEALAND

Imports

NEW Zealand's primary industries are largely directed to production for overseas markets, and the Dominion's economic stability depends upon its export trade in primary products. Paradoxically, the agricultural and pastoral industries have become increasingly dependent upon imports of farm requisites for maintaining and increasing the flow of their exports. In this article A. G. Rodda, Assistant Rural Economist, Wellington, discusses briefly the main import requirements of farming today.

A SURVEY of the import requirements of farming can achieve a two-fold object. In a country that has become "sterling-fund conscious" through a rigid policy of import selection and exchange control it can focus attention on the needs of the farming industries, which are the foundation of the Dominion's external trade. And by tracing the extent of the farmer's reliance upon imported commodities in the progressive development of the industry it can provide a useful picture of his increasing dependence on imports for continued production in successful competition for the world's markets.

A survey within the compass of this brief article cannot hope fully to achieve both of these objectives; a full treatment would cover not only farm requisites, but would also need to include commodities used by local industries manufacturing essential farm requirements and by industries processing farmers' products for sale or export. This discussion will, however, be confined primarily to the first of these groups, namely, imports of commodities essential for actual farm operations.

Within this group a further qualification must also be made. Many commodities essential for the farmer are also extensively used by other sections of the community. Notable examples are motor vehicles, motor spirit, power kerosene, tyres, galvanised corrugated iron, and building material and hardware generally. No reliable data are available on the actual farm usage of these items or on the extent of the farmer's share of their imports. It must suffice, therefore, merely to state that the farming industry has an important claim to a substantial share of the available supply of these commodities. Similar remarks apply to electric motors and internal combustion engines, although in this case data on farm usage are collected annually in the Agricultural and Pastoral Statistics. Table LXXXIV shows that over the past 20 years there has been an enormous increase in the farm use of electric motors. A substantial proportion of these is for the power units on dairy farms, particularly in the North Island, where their use has closely followed reticulation of the main dairying districts. Unfortunately it is not possible to relate these figures to the import statistics, as the latter show values only and not quantities of electric motors imported.

A final but necessary reservation remains to be stated. As this study is based mainly on published import statistics, many farm requisites, perhaps of relative minor importance but none the less essential, are not covered, as they are grouped with other commodities in one statistical item. An example is thermostats for incubators, which are included in the import statistics under the heading "measuring and recording instruments, etc."

Unless otherwise indicated, the import data used are based on the statistics compiled by the Customs Department and published by the Government Statistician in the Annual Trade and Shipping Statistical Report. The figures relate to the imports for each calendar year, and the values quoted are the current domestic values in the countries of export plus 10 per cent. expressed in terms of New Zealand currency. This 10 per cent. loading to cover the cost of freight and insurance is used over all classes of goods and preserves a basis of comparative import values year by year. But in relation to particular items isolated from their context, this loading might be too high or too low according to the nature of the goods. The values shown do not therefore necessarily represent the actual amount of overseas funds required to finance the purchase of a particular class of import.

Subject to the reservation that the scope of the article has been dictated by the available data, the main import requirements for farming operations will be discussed under the following headings:—

1. Livestock.
2. Stock foods.
3. Seeds.
4. Fertilisers, insecticides, etc.
5. Farm machinery.
6. Other items.

TABLE LXXXIV: Stationary Engines employed on Holdings of over 1 acre Outside Borough Boundaries 1922-1942.

	1922.	1927.	1932.	1937.	1942.
Electric motors	778	8,436	24,164	40,201	65,699
Nominal horsepower	2,581	16,723	37,179	46,710	66,435
Internal combustion engines ..	17,551	18,885	20,974	22,358	23,882
Nominal horsepower	57,004	58,545	65,200	69,431	72,252

Livestock

The breeding of pedigree and stud stock is of particular importance in the Dominion, where the livestock industry occupies such a predominant place. The foundation stock of New Zealand's flocks and herds were introduced by the early settlers, many of whom from their Old World experience had a keen appreciation of the value of good-quality animals. With the rapid extension of pastoral farming, increasing attention was given to the breeding and selection of stock suited to varying conditions of climate and topography and meeting the particular requirements of an expanding overseas market in dairy produce, meat, and wool. One of the more spectacular and better known achievements in this direction was the Corriedale, a new breed of sheep evolved in the South Island towards the end of last century in the quest for a dual-purpose animal combining the qualities of a good fleece and a good carcass. The advent of herd testing and the work of the Herd Recording Council of the N.Z. Dairy Board have been of outstanding value in directing the emphasis of dairy stock breeding to production performance rather than standards of appearance.

That the work of the New Zealand breeders has achieved a high standard is implicit in the demand from overseas for locally-bred stock, particularly sheep. But the trade is not entirely one-way, and New Zealand breeders have constantly sought from abroad high-quality stud animals not only for maintaining their pedigree stock but also for turning to advantage the results and experience of breeding work in other countries.

Table LXXXV shows the average annual importations of the main classes of livestock during each five-yearly period between 1921 and 1940.

TABLE LXXXV: Average Annual Imports of Livestock 1921-1940.

	1921-1925.		1926-1930.		1931-1935.		1936-1940.	
	No.	Value. £	No.	Value. £	No.	Value. £	No.	Value. £
Cattle	34	4,874	32	8,254	19	3,463	37	10,750
Sheep	617	8,531	267	5,698	231	3,438	695	8,491
Horses	91	22,768	109	25,105	50	12,809	79	25,312
Poultry	273	457	164	334	87	174	5	15*
Pigs	18	282	27	497	15	364	17	576*
Dogs	N.A.		N.A.		110	1,868	155	1,519

* 4 years average only—1940 not separately recorded.

Cattle, both beef and dairy breeds, have come mainly from the United Kingdom, also Canada and Australia, and at times from the United States. These countries have also supplied pigs and poultry. Australia and the United Kingdom are the sources of imported sheep and dogs. The association of the main sheep breeds of these two countries was the foundation of the New Zealand sheep industry, and regular importations of pedigree stock have been made.

The figures shown for imports of horses include thoroughbreds for stud and racing purposes. A considerable two-way traffic in racehorses is carried on between Australia and New Zealand, and although an adjustment has been made to the figures to exclude animals being returned to New Zealand after racing in Australia, a large proportion of the figures shown is probably made up of Australian horses brought to New Zealand for the same purpose. The number of animals imported for the breeding of working horses is small.

The main channel through which stock is imported is the stock and station agents, although some breeders import direct. The various breed associations also maintain close touch with their members' requirements and overseas markets, and have been of great value in maintaining and improving the quality of stock in the Dominion.

The rigid enforcement of measures to avoid the introduction into New Zealand of virulent animal diseases has probably been reflected in the numbers of livestock imported. Apart from the usual quarantine precautions, the importation of animals is strictly prohibited from many countries where diseases are endemic. Although the United Kingdom is one of the main sources of imported pedigree stock, the direct importation of cattle, sheep, pigs, and goats from Great Britain has been prohibited since a severe outbreak of foot-and-mouth disease in 1924. Stock were admitted only if domiciled for six months, reduced in 1933 to three months, in an intermediate country from which importation into New Zealand was permitted. The additional cost of bringing animals through a second country has been heavy, and it is probable that a relaxation of the restrictions would give an impetus to the importation of pedigree stock from the United Kingdom.

War conditions and restrictions have considerably reduced the imports of livestock over the past few years, and the spectacular prices that have been received by English breeders for pedigree animals will require a substantial commitment of our overseas funds if the desire of the New Zealand breeders for infusing fresh blood into their flocks or herds is to be realised.

Stock Foods

Although continuous grazing in the open is the basis of the Dominion's livestock industry, supplementary fodders are required when pasture growth is at its minimum in winter and in some localities during the driest part of the summer. In the colder districts of the South Island root and forage crops are the mainstay of the winter feeding of stock, while in the North Island the most important supplementary feed is in the form of hay and silage saved from pastures during the flush of the growing season.

In general home production of supplementary fodders is adequate to

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meet the country's needs, and in relation to the magnitude of her livestock industry the importation of stock foods is quite small. The exceptions arise mainly from the Dominion's failure to produce sufficient cereals to meet the requirements of certain stock, particularly pigs and poultry, by way of supplementary or normal ration. Average annual imports of the main stock foods other than wheat are shown in Table LXXXVI covering the period 1921-1940.

TABLE LXXXVI: Average Annual Imports of Various Stock Foods 1921-1940.

	1921-25.		1926-30.		1931-35.		1936-40.	
	tons.	£	tons.	£	tons.	£	tons.	£
Bran	1,269	9,438	417	3,768	321	1,560	2,092	13,027
Pollard	1,209	10,293	2,108	18,268	5,305	30,932	11,748	79,960
Barley (for feed only)	*	*	*	*	2,660	14,793	9,038	50,728
Maize	1,750	17,561	2,132	15,889	588	3,041	2,838	24,284
Oats	4,528	44,144	1,207	12,711	887	7,640	859	8,114
Chaff	4,163	25,541	2,123	12,902	131	550	77	431
Hay	37	215	—		19	75	—	
Linseed and other meals and cakes ..	‡	‡	‡	‡	‡	‡	1,280	14,156
Other foods for animals	—	9,571	—	8,117	—	3,201	—	7,592
Molasses	449	443	1,281	924	1,750	1,558	5,044	9,010

* Not separately recorded. ‡ Included in "other foods for animals."

With the exception of maize growing in the Auckland and Gisborne districts, cereal production in New Zealand is largely localised in the South Island, and it is mainly to meet the needs of the North Island farmer that feed grains are imported. Upwards of 2 million bushels of wheat are required annually for poultry feeding, and of this quantity approximately half is supplied from the local crop and consumed in the south and the remainder is imported into the North Island from Australia. Quite apart from the inadequacy of the New Zealand wheat crop for all purposes, it is normally cheaper to import wheat from Australia to Auckland than to transport the higher-priced Canterbury product to that market.

Bran and pollard are required mainly for poultry feeding, and the former is also needed for dairy herds supplying winter milk to towns. The flour-milling industry in New Zealand cannot furnish enough of these by-products to meet the local demand and it is necessary to import the deficiency from Australia.

Maize and barley are used for the feeding of both poultry and pigs, and regular importations are made to supplement local production. Profitable pig raising in New Zealand is possible only because dairy by-products provide the bulk of the feed. Grain feeding in any quantity is resorted to only to carry the animal through the winter, when the supply of separated milk is at its lowest. Imports of feed barley and maize have come from Australia, while South Africa and the Netherlands East Indies have also supplied substantial quantities of maize to the Dominion.

Varying quantities of oats have been imported for seed purposes or for use in the northern areas. Imports of chaff are now unimportant and would be made only under abnormal conditions of supply or price. Linseed and cottonseed meal and cakes are brought from Australia, and it is probable that any extension of the linseed oil industry in New Zealand would have a bearing on the quantities of linseed by-products required from overseas. Other meals such as copra meal and peanut meal, mainly for pig feeding, are also included under the same heading.

The item "other foods" in the table covers a variety of specialised foods for all types of birds and animals and includes poultry spices, mixed bird seeds, and a number of proprietary lines of specially-prepared foods, mainly from the United Kingdom and Australia.

Just prior to the war the demand for molasses had expanded rapidly, and imports from Australia had shown a marked increase. This by-product of the sugar industry was being extensively used by dairy farmers for feeding in the spring to assist in the prevention of post-calving troubles such as grass staggers and milk fever.

This discussion on imported stock foods has been confined to the position existing before the severe drought in Australia completely removed the main source of New Zealand's imported grain feeds and by-products. As a result of the drought the Commonwealth has been unable to meet her own grain requirements, and severe stock losses have been experienced. Extensive rationing has been necessary in New Zealand, and although the winter feeding of pigs can be largely met by the growing of supplementary root and other crops, where cereals form the basic ration, as in poultry feeding, the problem of maintaining production has been particularly difficult.

When normal conditions return the extent to which grain feeds are imported will again largely depend on local cereal production, the continued expansion of the livestock industry, and the relative prices at which the imported grains can be offered to the farmer.

Seeds

Following the advent of refrigeration in 1882, New Zealand's pastoral industry expanded very rapidly with the development of the export trade in dairy produce and meat. By 1900, 11 million acres of pastures were sown down, of which 6½ million were surface sown following a burn and 4½ million were established after cultivation. During the next 20 years sown pastures had increased to 16 million acres, and up to 1940 almost 2 million acres had been added to this total.

Although the average annual area of virgin land sown down to pasture during the 10 years 1930 to 1939 was only 82,000 acres, up to half a million acres previously in grass or under cultivation were resown each year during that period. Thus the renewal of deteriorated pastures and the requirements of temporary leys in a crop rotation on arable farms, as well as the wider use of improved strains of grasses made available through breeding and selection, have maintained a heavy demand for pasture seeds.

The early pastoral development had been accompanied by substantial imports of grass and clover seeds, mainly from the United Kingdom. But in many parts of New Zealand climatic and soil conditions were very favour-

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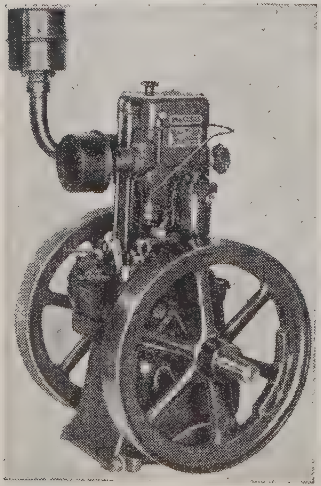

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able for seed production, and in addition to growing for the local market the foundations were laid of an important export trade in grass and clover seeds. By the turn of the century the quantity of seeds exported was considerably greater than the amount imported, although the latter continued to increase.

The subsequent continuation of imports side by side with exports was not as paradoxical as might first appear from a study of the early trade statistics, which grouped all varieties of grass and clover seeds under the one heading. The main exports were ryegrass, chewings fescue, crested dogstail, browntop, and cocksfoot, with red and white clovers. The principal imports were cocksfoot, timothy, and paspalum, with alsike and subterranean clovers as well as small quantities of red and white clovers.

In 1925 the trade statistics segregated grass seeds and clover seeds, but although a number of the main grasses were shown separately, it was not until 1928 that the clovers were given an itemised classification. Table LXXXVII shows the average annual quantities and values of seeds imported during each quinquennial period from 1925 to 1944.

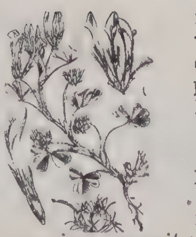
TABLE LXXXVII: Average Annual Imports of Agricultural and Horticultural Seeds 1925 to 1944.

	1925-1929.		1930-1934.		1935-1939.		1940-1944.	
	Cwt.	£	Cwt.	£	Cwt.	£	Cwt.	£
Clovers—								
Red	5,763	34,554	959	4,092	736	3,809	—	—
White			364	1,843	32	125	—	—
Alsike			950	3,594	840	4,499	60	413
Subterranean			*		3,582	24,294	2,363	20,817
Other clovers			877	5,097	258	1,571	27	159
Lucerne	428	1,985	375	1,235	297	1,010	278	1,610
Grasses—								
Cocksfoot	8,933	34,226	479	1,277	307	868	—	—
Ryegrass	236	503	1,069	1,550	110	224	—	—
Paspalum	2,135	13,654	1,233	7,092	1,504	9,881	1,097	6,826
Timothy	3,381	6,838	2,397	4,745	2,836	5,868	1,568	3,955
Poa pratensis ..	‡		73	364	300	1,237	159	1,080
Other grasses ..	2,387	11,942	636	2,606	527	2,275	11	98
Rape and kale ..	3,890	9,677	5,440	13,631	4,613	15,379	294	3,104
Turnip and swede ..	4,940	28,849	5,061	30,685	4,745	32,072	975	7,400
Other agricultural and horticultural seeds ..		42,774		32,787		32,561		52,961

* Included in "other clovers." ‡ Included in "other grasses."

Although the export of red and white clover seeds was very substantial before the war, varying quantities of these seeds were imported from the United Kingdom, Canada, and European countries. Price, variations in climatic conditions, and the demand for specified or new strains were the main factors influencing the quantities imported. During the war imports of red and white clover have not been permitted.

Of the imported clover seeds subterranean clover has over the past two decades become by far the most prominent. Subterranean clover is a very valuable pasture constituent on light land that dries out rapidly or where it is difficult economically to



raise soil fertility to the standard required by high-class permanent pastures. Introduced by oversowing on hill country that cannot be ploughed, subterranean clover spreads rapidly and increases carrying capacity by simultaneously raising soil fertility and providing good palatable grazing. A prominent feature of this clover is its remarkable response in dry country to topdressing with superphosphates—in fact systematic topdressing is essential for its profitable establishment and maintenance.

Due to climatic conditions and the seeding habits of the subterranean clover, its seed is not normally harvested in New Zealand, and the Dominion relies upon Australia for its supplies. Imports were not recorded separately until recent years, and in Table LXXXVII they are included under "other clovers" until 1935. During the war the quantity imported has fallen considerably, due not only to the excessively high price and supply difficulties but also to the fertiliser shortage. When fertilisers become more freely available for topdressing hill country the demand for subterranean clover seed is likely to increase rapidly.

After 1930 imports of cocksfoot seed were unimportant, but up to that time substantial quantities of cheap Danish cocksfoot were brought in. The Danish strain is a heavy seed producer, but it has a high proportion of stalk with a low proportion of leafage, and is unsuitable for permanent pastures, where the higher leaf yield of the perennial New Zealand strain produces superior grazing. Since 1929 imported cocksfoot seed is required by regulation to have 1 per cent. of its seed stained red to ensure identification and prevent its sale as a New Zealand-grown product. During the war imports of both cocksfoot and ryegrass seed ceased.

Of the remaining grass seeds imported the principal varieties are timothy, paspalum, and *Poa pratensis.* According to soil, climate, topography, and management practice, these grasses are required in small and varying quantities for adding to the basic ryegrass-clover mixture. Timothy for heavy land or for medium land with high rainfall is imported from the United States and Canada. For permanent pastures on rich and swampy soils in warm districts paspalum is brought from Australia. If any large-scale land development is undertaken in North Auckland, substantial quantities of paspalum seed would be required for satisfactory pasture establishment in that district. *Poa pratensis* from the United States of America thrives on the less fertile soils and is valuable on hill country, where the more exacting grasses deteriorate with the decline of fertility following a burn.

Separate details of "other grass seeds" are not available, but the item includes varying small quantities of meadow foxtail, meadow fescue, *Poa trivialis,* and others.

Brassica Seeds: An outstanding feature of New Zealand seed growing during recent years has been the rapid development of brassica seed production. Until 1941 up to 600 tons of rape, kale, turnip, and swede seeds were imported annually for the growing of fodder crops. The United Kingdom was the main source of supply, although quantities were also obtained from European countries, particularly the Netherlands. Since 1941 local production of brassica seeds has increased to such an extent that

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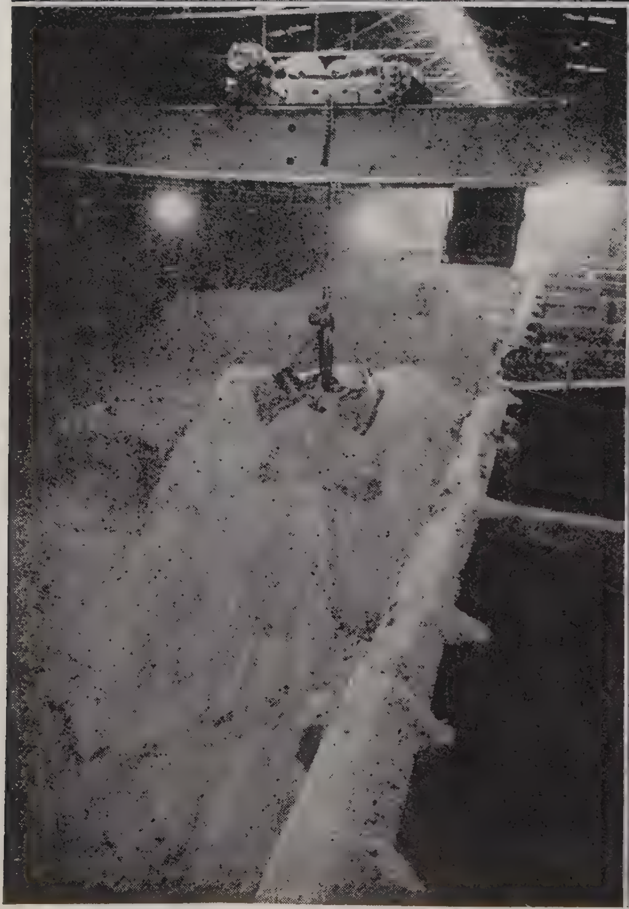
[*Sparrow Industrial Pictures photos.*



New Zealand no longer requires these imports and has been able to export small quantities to the United Kingdom, whose Continental supplies had been cut off by the war.

"Other agricultural and horticultural seeds" include vegetable and flower seeds, but the increase in the total value of these imports over the past 5 years reflects the higher wartime prices rather than increased quantities. Despite the drive for greater vegetable production during the war, imports of these seeds have been reduced considerably, and many varieties formerly brought from the United Kingdom are now produced locally to meet the Dominion's needs. For example, approximately half of New Zealand's requirements of onion seeds were formerly imported, but by 1941 home production not only met local needs in full but provided a surplus for export to the United Kingdom.

Wartime conditions and the strict import and export control to which they gave rise have clearly demonstrated that New Zealand can be largely self-supporting in her major seed requirements. It is early yet to forecast the future if an early return is made to the pre-war conditions of trade. The unpredictable factor is price and its effect on both exports and imports. There has always been some demand for cheap seeds irrespective of quality, and although much valuable work has been done to demonstrate the advantages of using only highest-quality or certified seeds, while the demand for cheapness without quality persists it will continue to influence both the local production of seeds and their international movement.

Fertilisers, Insecticides, etc.

The use of fertilisers plays an important part in the farm management practices of the Dominion. In particular, the successful topdressing of pastures with phosphates has enabled the intensive grassland farmer to exploit to the full the natural advantage of a climate favourable to the growth of pasture almost continuously throughout the year.

One of the major factors contributing to the remarkable increase in carrying capacity of sown pastures over the past 20 years has been the luxuriant growth promoted by the application of phosphatic fertilisers. Between January 1, 1927 (the first year of collection of data), and January 1, 1941, the total area of grassland topdressed (with artificial fertilisers, lime, or a mixture of the two) had more than trebled—from approximately 1.5 million acres to 4.6 million acres. Between 1915-16 and 1942-43 it has been estimated that the carrying capacity of our pastures increased by approximately 46 per cent.*

TABLE LXXXVIII: Summary of Estimated Fertiliser Usage (in long tons) 1922-23 to 1942-43 (no Serpentine or Lime included).

Season.	Super-phosphate (straight)	Other Phosphates.	Blood & Bone: Blood: Bone: etc.	Potashes: Sulp. Ammonia Nit. Soda.	Total.
1922-23 ..	N.A.	28,208	23,398*	N.A.	N.A.
1923-24 ..	N.A.	49,104	18,762*	N.A.	N.A.
1924-25 ..	N.A.	54,458	19,278*	N.A.	N.A.
1925-26 ..	N.A.	69,830	18,812*	N.A.	N.A.
1926-27 ..	187,761	71,814	19,768*	12,648	291,991
1927-28 ..	295,919	66,487	21,331*	8,009	391,746
1928-29 ..	275,488	151,249	24,746*	13,701	465,184
1929-30 ..	299,327	183,555	24,031	18,992	525,905
1930-31 ..	234,220	125,266	25,340	17,814	402,640
1931-32 ..	231,078	97,021	22,556	9,157	359,812
1932-33 ..	307,224	59,480	26,115	10,513	403,332
1933-34 ..	280,418	64,266	24,001	7,490	376,175
1934-35 ..	313,924	25,305	23,021	11,178	373,428
1935-36 ..	331,029	54,895	25,234	15,242	426,400
1936-37 ..	370,178	92,337	25,338	15,027	502,880
1937-38 ..	447,407	120,862	21,676	21,371	611,316
1938-39 ..	461,572	107,291	23,535	21,990	614,388
1939-40 ..	511,570	111,896	26,684	22,461	672,611
1940-41 ..	598,529	58,534	29,846	11,748	698,657
1941-42 ..	418,562	47,563	32,221	4,085	502,431
1942-43 ..	294,935	27,374	34,828	5,194	362,331

*Because of alterations in the basis of the Census and Statistics Department's returns, these years are not strictly comparable with those in subsequent years.

TABLE LXXXIX: Average Annual Imports of Fertilisers 1921-1940.

	Average Annual Imports (in long tons).				Actual Imports.
	1921-25.	1926-30.	1931-35.	1936-40.	1939.
Nitrogenous:					
Sulphate of ammonia	1,023	4,280	4,842	4,726	4,724
Nitrate of soda	688	1,659	1,270	2,679	1,794
Phosphatic:					
Basic slag	29,971	66,599	33,160	57,805	40,334
Bonedust and bone char	3,382	1,181	64	263	452
Guano	9,054	20,789	19,531	20,387	27,665
Rock phosphate	70,393	142,883	178,760	292,605	351,578
Other phosphates	7,155	33,983	7,564	19,996	43,907
Potassic:					
Kainit	3,255	1,236	708	507	648
Muriate of potash	26	25	139	380	200
Sulphate of potash	840	1,572	697	860	1,131
Others (30% potash salts, etc) ..	1,223	6,737	4,222	11,614	16,417
Sulphate of iron	56	69	18	9	15
Other manures	6	358	70	386	663
Average annual values as per Customs statistics ..	£ 345,643	£ 611,710	£ 475,343	£ 684,774	£ 741,145

Although the great increase in fertiliser usage in New Zealand is largely attributable to its use for topdressing, particularly on the high-producing dairy lands of the North Island, it is also used extensively in the arable areas of the South Island in contributing to the high per acre production of cereals and other cash crops.

Table LXXXVIII summarises the estimated fertiliser usage over the past 20 years and clearly illustrates the overwhelming importance of phosphates, which account for over 90 per cent. of the total usage.

With the exception of the blood and bone organic manures, New Zealand relies almost entirely upon overseas sources for its fertiliser supplies. In addition to fertilisers ready for application, rock phosphates (and nitrate of soda) for the manufacture of superphosphate in the Dominion are the main imported items.

Table LXXXIX shows the average annual imports and values of fertilisers for each quinquennial period from 1921 to 1940, based on the classification used by the Customs Department in the import statistics under the heading "manures." Although sulphate of iron is not recognised as a fertiliser under the Fertilisers Act, 1927, it is usually included in the import figures. The actual imports of fertilisers for the calendar year 1939 are also shown, because, although a drastic cut in imports of basic slag had even then been necessary, 1939 may be regarded as the last year before wartime conditions changed the whole outlook for fertiliser supplies.

During the 20 years up to 1941 the Ocean and Nauru Islands supplies administered by the British Phosphate Commissioners have become by far the most important source of rock phosphates for the manufacture of superphosphate in the Dominion. Since 1921, when 22,158 tons were shipped to New Zealand, the quantity imported from that source has increased to its maximum of 351,578 tons in 1939. The value to New Zealand of these high-grade deposits available at comparatively low cost cannot be overestimated. When the British Phosphate Commissioners were estab-

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*W. M. Hamilton, "The Dairy Industry in New Zealand," p. 59.

ONE WAR STOPS....
ANOTHER STARTS ON SHEEP PARASITES!

With the cessation of hostilities and relaxation of commodity control, sheep dips of pre-war type have become available again.

The absence of derris in wartime dips, brought home great realisation of the important part this ingredient plays in tick (ked) control. Thousands of N.Z. farmers will again use one of the following well-known brands this season:

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lished after the last war, following an agreement between Great Britain, Australia, and New Zealand, the Dominion was to receive 16 per cent. of the annual output of Nauru and Ocean Islands against 42 per cent. each to Great Britain and the Commonwealth. Since 1925, however, New Zealand has received considerably more than her quota, as Great Britain has relied upon other closer sources for her supplies.

The effects of the world depression were reflected in the imports of rock phosphates, which in 1930 were only 119,293 tons—23 per cent. lower than the 1929 tonnage. To arrest this decline and assist in the maintenance of soil fertility the Government in 1931 reduced the cost of superphosphate to the farmer by subsidising its manufacture. This subsidy was reduced year by year, and then discontinued in 1936.

Until 1934 Tuamotu Archipelago (Makatea Island) also supplied substantial but declining quantities of rock phosphate to New Zealand.

The Customs classification "other phosphates" covers imports from various sources, either for supplementing supplies required for the manufacture of superphosphate or, in the case of finely-ground North African phosphates, for direct application to the soil. Egypt was the main country of supply up to 1928, Morocco from 1928 to 1930, and from 1929 varying quantities of Tunisian phosphates ground in Belgium were brought to the Dominion.

When Japanese occupation of Ocean and Nauru Islands completely cut off that source of raw rock phosphate, New Zealand's allocation of available world phosphate supplies was drawn from the widely-scattered sources already mentioned, such as Makatea Island, Florida, Morocco, and Egypt. It is likely to be some time before rock phosphate is again available from Ocean and Nauru Islands on the prewar scale.

Belgium and the United Kingdom have supplied the bulk of the Dominion's requirements of basic slag, the peak annual quantity exceeding 94,000 tons. Imports were considerably curtailed during the depression and ceased altogether during the war. Guano has come mainly from the Seychelles Archipelago and New Caledonia (Walpole Island), and at times from Madagascar.

The principal sources of potassic fertilisers have been Germany, France, and Belgium, with the United States furnishing wartime supplies. Sulphate of ammonia has come from the United Kingdom and, during the war, from Canada, while Chile supplies our requirements of nitrate of soda.

It has been estimated that the Dominion's annual usage of all fertilisers will be upwards of 900,000 tons in the post-war years, but the early attainment of this total will depend on availability of supplies and shipping facilities. War conditions have very substantially increased the landed cost of fertilisers, and future price movements are extremely uncertain. It is likely, however, that up to £N.Z.3,000,000 will be needed to finance the Dominion's requirements of imported fertilisers as they become available. This assumes a substantial reduction in the present landed cost of rock phosphate.

Table XC shows the average annual imports between 1921 and 1940 of some of the more important chemicals, insecticides, etc., required for the farmer.

Large quantities of sulphuric acid are needed for the treatment of raw rock phosphate in its conversion to superphosphate. Sulphur from the Texas Gulf and, before the war, from Japan and Sicily is used for this purpose, and total importations for all uses had exceeded 50,000 tons annually in the pre-war years. For an estimated annual usage of 400,000 tons of rock phosphates in the next few years approximately 70,000 tons of sulphur would be required for this purpose alone.

Chemical preparations for the prevention and treatment of plant diseases and parasites are of particular importance to the horticulturist. Many of these preparations are either imported ready for use or certain ingredients are brought in for mixing with local products before sale or by the user according to his requirements. Copper sulphate, the basis of Bordeaux mixture for controlling many fungus diseases, is brought from the United Kingdom, although increasing quantities have been manufactured locally from scrap copper. The remainder of the insecticides and fungicides imported, including spraying oils, arsenate of lead, and nicotine sulphate, are grouped under the one heading. The United Kingdom, United States, and Australia are the main sources of supply. Details of imported weed-killing preparations are not available, although sodium chlorate from the United Kingdom and Canada is recorded separately. The control of noxious weeds is a problem requiring serious consideration in a country whose basic industry is derived from the soil. Much progress has been made by the use of chemical weed-killers, especially sodium chlorate, which is widely used for the control of ragwort.

Strychnine from the United Kingdom is a valuable ally of the extensive pastoral farmer in combating the rabbit pest. Sheep and cattle licks from the United States supply certain mineral deficiencies to stock. Sheep dip is an essential commodity for the sheepfarmer in New Zealand, where the regular dipping of sheep is compulsory by law.

TABLE XC: Average Annual Imports of Certain Chemicals, Insecticides, etc., 1921-1940.

	1921-1925.		1926-1930.		1931-1935.		1936-1940.	
	tons.	£	tons.	£	tons.	£	tons.	£
Sulphur	11,477	41,997	29,586	120,369	34,644	191,283	52,283	278,369
Insecticides & fungicides	—	18,303	—	20,917	—	23,218	—	35,155
Copper sulphate ..	115	3,582	133	3,911	98	2,215	54	1,572
Sodium chlorate ..	—	N.A.	—	N.A.	472	14,412	747	25,187
Strychnine	—	6,187	—	3,304	—	4,729	—	5,159
Sheep and cattle licks ..	—	794	—	2,698	—	1,911	—	4,549
Sheep dip	—	78,672	—	85,515	—	87,292	—	107,644

TABLE XCI: Farm Machinery Employed on Holdings Over 1 Acre Outside Boroughs. 1922-1942.

	1922.	1927.	1932.	1937.	1942.
Milking plants	12,468	17,090	23,222	27,331	31,487
Cream separators	38,861	45,246	51,334	56,850	54,107
Agricultural tractors	412	2,588	4,856	6,585	13,967
Shearing machines—					
Plants	5,468	6,305	7,853	8,867	11,555
Stands	17,788	19,269	22,326	24,229	28,611
Wool presses	8,253	8,832	*	*	*
Reapers and binders	15,645	15,287	*	*	*
Threshing machines	390	364	504‡	656‡	1,129‡
Chaffcutters	3,179	2,562	*	*	*
Rotary hoes and garden tractors ..	*	*	*	*	813
Electric motors	778	8,436	24,164	40,201	65,699
Internal comb. engines	17,551	18,885	20,974	22,358	23,882

* Not available. ‡ Only machines actually used during year.

TABLE XCII: Factories engaged in Agricultural and Dairying Machinery and Implement making.

	1922.	1927.	1932.	1937.	1942.
No. of factories	33	25	32	54	61
Persons engaged	900	885	505	1,152	1,317
	£	£	£	£	£
Salaries and wages paid	201,329	191,002	97,761	257,084	363,251
Cost of materials used	224,701	295,725	132,784	565,141	719,859
Total value of manufacture (including repairs)	591,240	607,339	280,751	1,091,275	1,422,201

Farm Implements & Machinery

The New Zealand livestock farmer is able to compete successfully on the overseas market and at the same time maintain a relatively higher standard of living than his competitor because he is able to secure an exceptionally high output per unit of labour employed. Fundamentally he owes this to the unique advantages of highly favourable conditions of soil and climate, but in scarcely less measure is it due to his readiness to use and adapt modern machine methods, simultaneously reducing labour and increasing output.

The most significant developments in the use of labour-saving machinery have been the wide adoption of machine milking and shearing with power and heating supplied by electricity or, in outlying districts not yet reticulated, by internal combustion engines. Cultivation methods with up-to-date tillage implements have been based on four- or six-horse teams, which are now being rapidly replaced with tractors. Modern harvesting machinery has found a ready market and header harvesters are in wide use.

These developments in the use of mechanised equipment on farms over the past 20 years are illustrated in Table XCI. More recently the demand for machinery has been intensified as a result of the drive for increased production for war purposes, coupled with the severe labour shortages of the war years.

The local manufacture of farm implements and machinery from imported raw materials and parts has increased considerably, and this has been hastened by import control and wartime shipping difficulties. The New Zealand inventor and manufacturer have been successful in the design and adaptation of many classes of implements to suit local conditions and improve standards of performance. Table XCII shows the growth of this local manufacture between 1922 and 1942.

In addition to manufactured parts which are used in the assembly of locally-made ploughs, discs, drills, cultivators, shearing and other machines,

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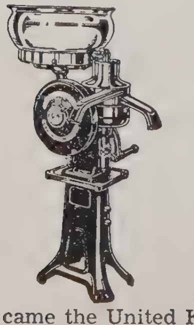
the most important items required from overseas are tractors, cream separators, mowers, and harvesting machinery. Table XCIII shows the average annual values of agricultural implements and machinery and parts imported between 1924 and 1944. The dairying machinery includes factory equipment such as churns, butter workers, and factory separators used in the processing of his product and not by the farmer himself.

TABLE XCIII: Average Annual Values of Agricultural Implements and Machinery Imported 1925-1944.

	1925-29. £	1930-34. £	1935-39. £	1940-44. £
Agricultural implements and machinery ..	203,570	136,210	293,839	284,181
Dairying machinery	139,764	158,777	127,774	80,358
Tractors and parts	159,064	63,362	555,401	644,371

By far the most important individual item is the tractor. Although the period between the two world wars witnessed a substantial increase in the use of agricultural tractors, the last few years have given a tremendous impetus to the demand for tractors of all types. In 1944 the value of all tractors and parts imported was £1,200,000, and it is probable that the future annual demand for increased usage and replacements will exceed 3,000 machines. Sweeping claims that the tractor has materially increased production cannot usually be upheld. Apart from the undoubted success of heavy track machines in reclaiming and bringing into production large swamp areas, the principal achievement of the tractor remains in its ability to lighten and increase the efficiency of labour.

The United States is predominant in the supply of farm machinery and tractors to the Dominion. In 1939 86 per cent. of the tractors and 40 per cent. of the machinery and parts by value came from that source, and these percentages have been increased during the war under lend lease arrangements. Next in importance in the supply of machinery came the United Kingdom 30 per cent., Canada 14 per cent., and Australia steadily increasing to 10 per cent. Dairying machinery, particularly cream separators, was imported mainly from Sweden and the United Kingdom.



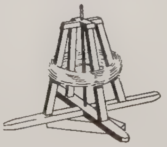
Favourable prices for his products during the war have greatly assisted the farmer in his process of mechanisation. With the prospects of a continuation of these favourable returns for the next two or three years will go an increased demand for new and improved types of implements and machinery.

Other Items

The farmer relies upon overseas sources for a number of important commodities that have not yet been mentioned. The main items that will be considered here are fencing materials, sacks, and woolpacks.

Between 5 and 6 million cornsacks are brought from India each year, as well as substantial quantities of other bags and sacks for the varied needs of the farmer. Approximately half of the Dominion's total annual requirements of a million woolpacks is also imported from India, the remainder being manufactured locally from *Phormium tenax* fibre. With complete reorganisation and substantial capital expenditure, the *Phormium tenax* industry could be expanded to meet the country's full requirements of woolpacks.

From the time when land settlement first began in the early days of the colony boundary fencing for the control of grazing stock was a prominent item in the development of farm lands. With the rapid extension of pastoral farming over the past 50 years and the closer settlement that has accompanied it, the demand for fencing materials has increased both for repairs and renewals and new work. Sub-division has been carried out not only for the establishment of new farming units, but also within the individual farms for better utilisation of pasture growth. Improvements in farm management practices and the development of what has been termed a "grassland technique" have brought home to the farmer the realisation that the full benefits of rotational grazing can be secured only if subdivisional fences are maintained in good repair.



The main imported materials required have been plain and barbed fencing wire, wire netting, and staples. Importations have varied considerably, and before the war up to 8,000 tons of plain and 4,000 tons of barbed wire valued at approximately £250,000 were being imported annually from the United Kingdom, Australia, and Canada. The farming community, either directly or indirectly, used a large proportion of those quantities. Up to 100,000 rolls of wire netting valued at approximately £100,000 were also imported from the same sources for poultry and pig pens, for the sheepfarmer, and for other purposes. Staples formerly imported ready for use can now be manufactured locally from the imported wire.

The acute shortage of fencing timber over the past few years has caused an increased use of concrete posts, for which reinforcing steel is required. Fencing standards made from imported steel are also likely to be widely used in the future.

During the war difficulties in securing the necessary labour and materials have meant that much of the normal fencing work on farms has been deferred, and it will probably be some years before the arrears of maintenance are overtaken.

This limited examination of imported farm requisites has briefly surveyed a wide variety of commodities on which New Zealand depends for increased farm production.

If full employment and rising standards of living are achieved both at home and abroad, and favourable relative prices for butterfat and lamb are maintained, expansion of livestock farming is likely to take place at the expense of cereal production, with corresponding increases in the Dominion's requirements of imported grain both for human consumption and for stock foods. If the demand for further settlement is to be met by bringing into production existing marginal land, machinery and equipment will be required and substantial quantities of fertilisers will be needed to establish and maintain satisfactory pastures. Adequate supplies of fertilisers for topdressing will also be essential in any plans for the rejuvenation of deteriorated hill country and the control of erosion through pasture improvement.

◆

Common causes of footrot and precautionary measures necessary are treated in Bulletin No. 172, "Footrot in Sheep," which is available free from offices of the Department of Agriculture.

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Handy Type of Bee Veil

A GOOD veil is an important article of equipment, and wise beekeepers always wear a veil of some sort when working with their bees, as it provides a sense of security that enables hive requirements to be attended to with more despatch than is possible when a sting is anticipated from every bee that chances to buzz near the face.

Many commercial beekeepers use the wire type of bee veil in preference to the lace type, because they stand up to harder wear and are not so likely to catch or tear on shrubbery and other obstructions. The advantages of the wire veil are recognised, but the usual types are somewhat bulky and inconvenient, because they cannot be folded. The veil illustrated is collapsible and, when folded, can be tucked into any convenient space without risk of damage or inconvenience. It incorporates all the features of other types, and may be more rapidly fitted and removed.

The bee veil illustrated is made up of five wire panels held together by strips of tape. The side panels are wedge shaped to provide free head movement. The front panel is painted black to improve the vision. Beekeepers handy with a needle and thread can readily manufacture this type of veil for themselves. The materials used are:—

36in. x 10in. wire gauze for front and sides of visor.

24ft. ¾in. tape for bindings and hinges.

30in. elastic for rear and side shoulder pieces.

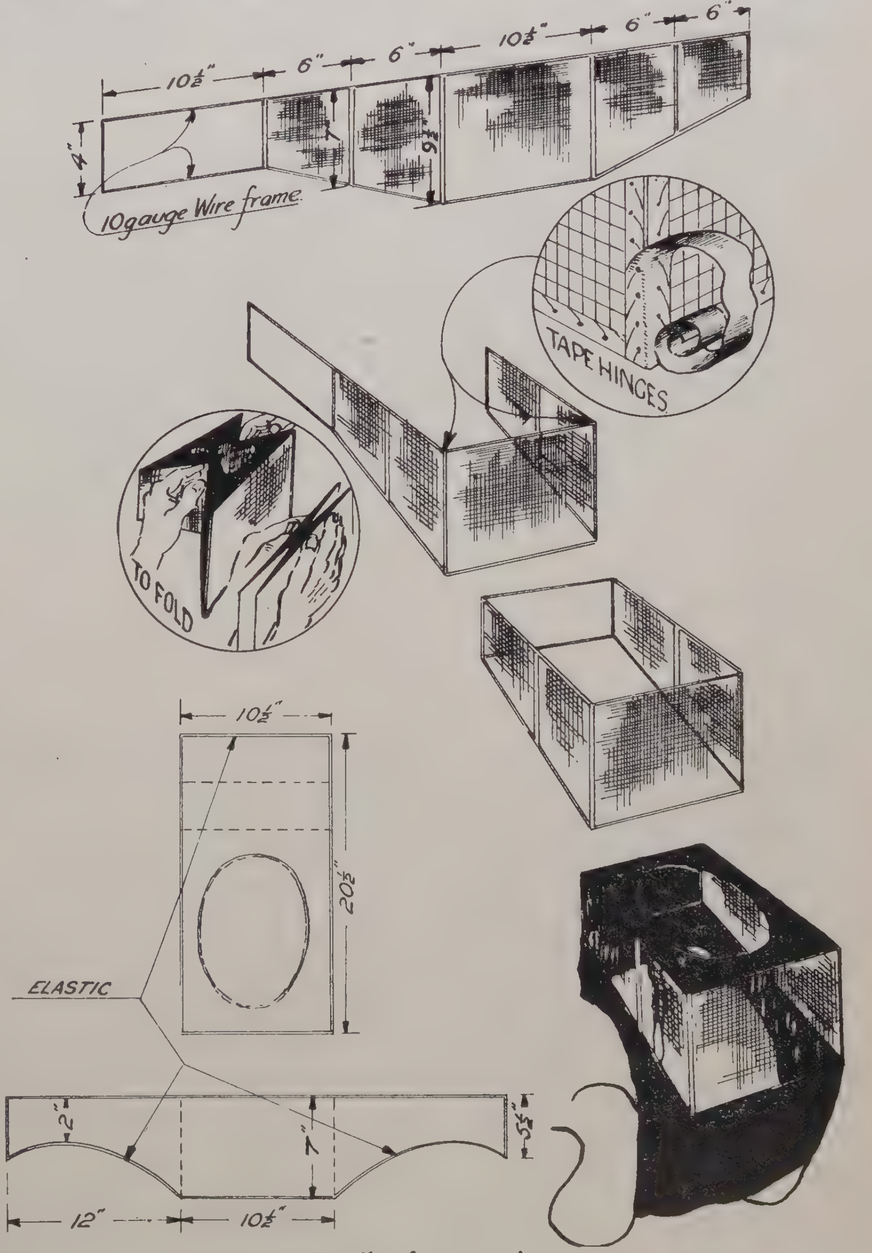
½ yard linen cloth.

The front and side sections of the veil are cut from the wire gauze. Each section has the edges turned in ¼in. all round, and when bound with tape the outside measurements should be as indicated. The rear frame is 10 gauge wire bound with tape. All these sections are joined in the order shown by sewing tape to the bindings, care being taken to ensure that the hinge thus made allows for complete folding when in the collapsed position.

The illustration shows the finished measurements for the top and shoulder pieces, so it is necessary to make allowance for ½in. hems. Bind the hat band opening with bias tape and then oversew the material to the tape at the top of the front and side wire sections. Carry the material over the rear wire frame, but attach it to the sides only, leaving the centre back hanging free. Next attach the top portion of the shoulder material to the tape on the lower edges of the front and side wire sections, taking in the centre back material which is hanging free.

To complete the veil sew tapes 3ft. long at the lower front corners of the shoulder material and a 12in. loop to the bottom edge of the centre back as illustrated. Elastic threaded through the sides and back should be adjusted to individual requirements, so that the veil is comfortable and at the same time bee-proof.

—E. SMELLIE, *Apiary Instructor, Christchurch.*



Details of construction.

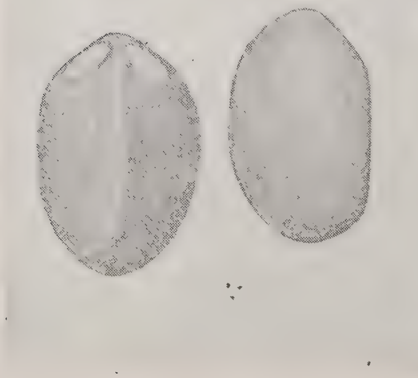
Weed Seeds In Agricultural Seed

(Seventh Series).

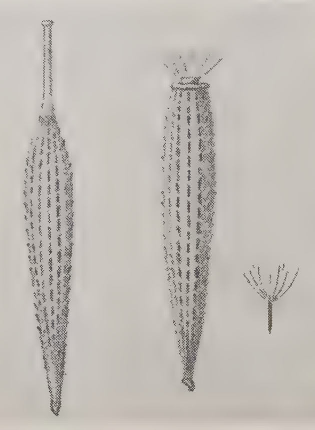
By

E. O. C. HYDE,
Seed Analyst, Seed-Testing Station,
Palmerston North.

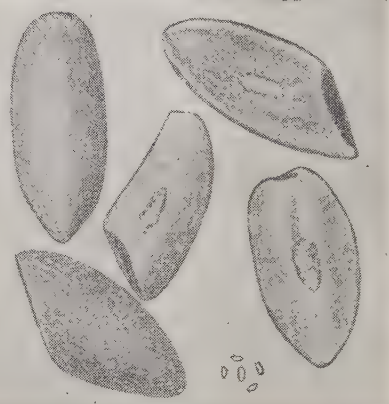
The preceding six series of illustrated weed seeds appeared in the January, May, June, July, August, and October issues respectively of the "Journal."



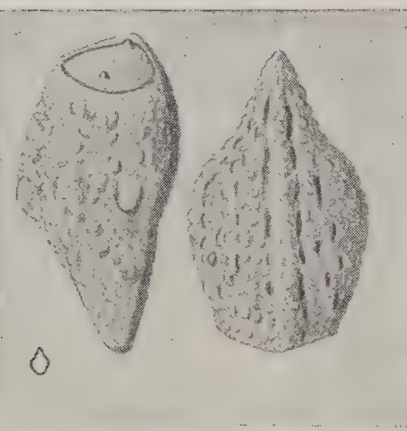
MENTHA PULEGIUM: PENNYROYAL. Colour brown. Occurs with medium frequency in seed of browntop and *Lotus spp.* A creeping perennial weed, troublesome in wet pastures.



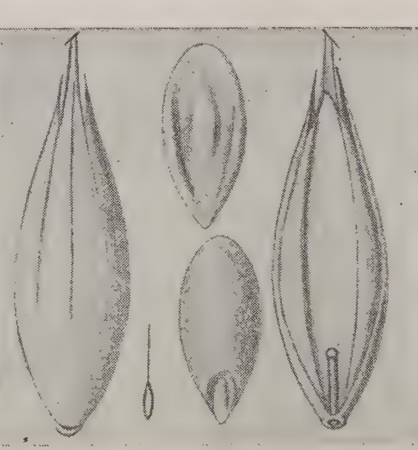
HYPOCHAERIS GLABRA: SMOOTH CATSEAR. Colour dark brown. Occurs with medium frequency in ryegrass, cocksfoot, and crested dogstail. The seeds from the centre of the flower head are beaked. An annual weed of pastures.



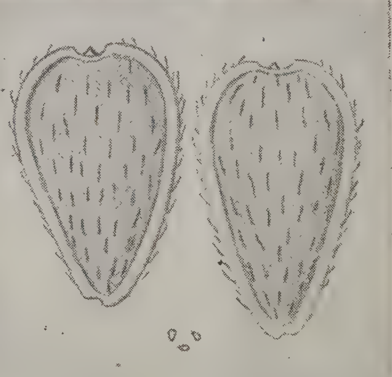
PLANTAGO RUGELII: PALE PLANTAIN; RUGEL'S PLANTAIN. Colour black. Occurs frequently in timothy seed from America. This weed has not become established in New Zealand.



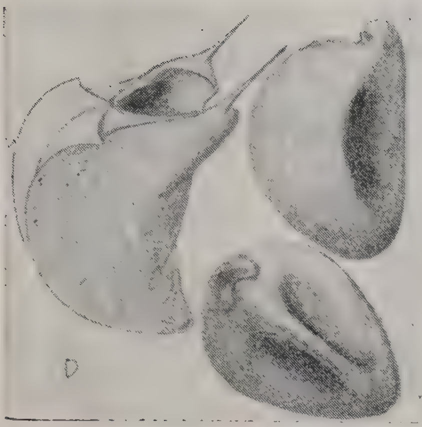
LITHOSPERMUM ARVENSE: CORN GROMWELL. Colour brown. Occurs with medium frequency in grain imported from Australia. An annual weed of cultivated land.



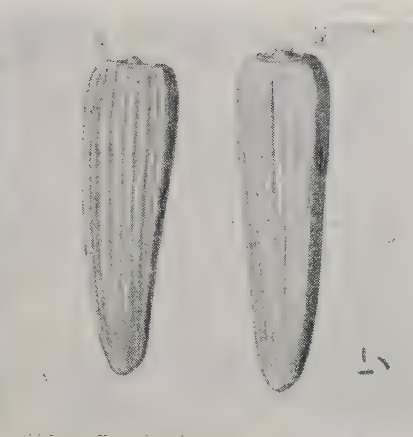
CYNOSURUS ECHINATUS: ROUGH DOGSTAIL. Straw coloured. Occurs with medium frequency in ryegrass seed. An unimportant annual grass.



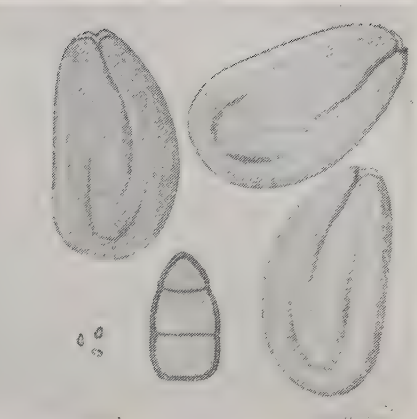
BELLIS PERENNIS: DAISY. Colour yellow to light brown. Occurs rarely in crested dogstail and yarrow. A perennial rosette weed common in pastures and lawns.



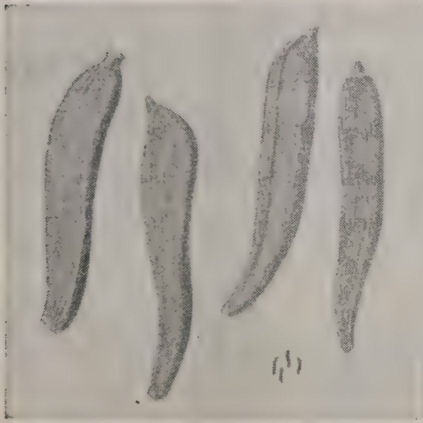
SIDA SPINOSA: PRICKLY SIDA; INDIAN MALLOW. Colour dark grey. Occurs frequently in subterranean clover seed imported from Australia. The species has not established itself in New Zealand.



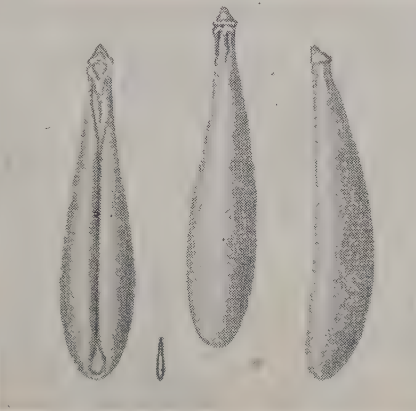
RUDBECKIA HIRTA:. BLACK-EYED SUSAN. Colour dark grey to black. Occurs frequently in timothy seed imported from America. This weed has not become established in New Zealand.



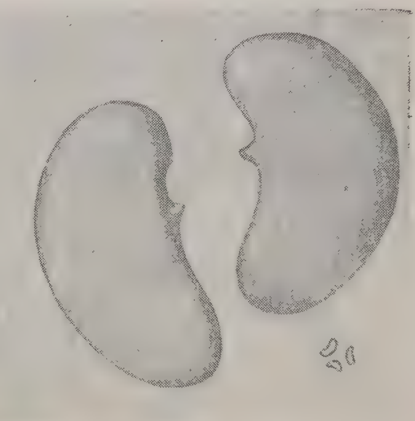
LEPIDIUM RUDERALE: NARROW-LEAVED CRESS. Colour yellow to brown. Occurs frequently in white clover, yarrow, crested dogstail. An annual weed of cultivated land and open pastures.



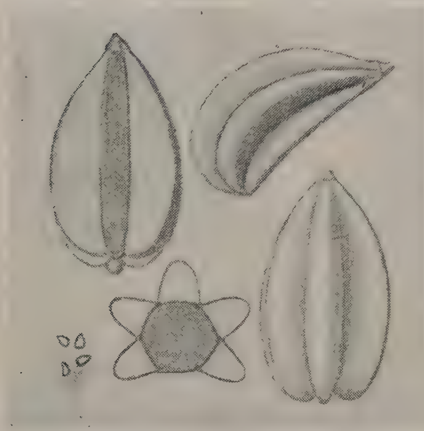
LEPTOSPERMUM SCOPARIUM: MANUKA. Colour reddish-brown. Occurs rarely in browntop. An aggressive weed on unploughable land. Although it may develop into a small tree, the plant flowers and sets seed when only a few inches high.



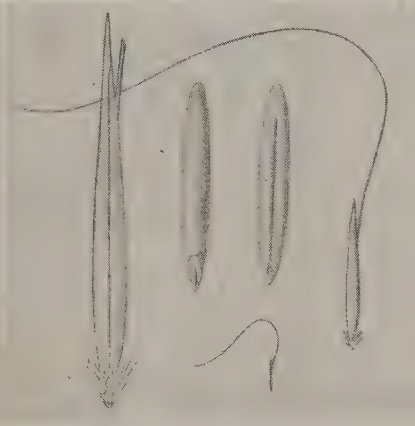
ANTHRISCUS SYLVESTRIS (Chaerophyllum sylvestre). WILD CHERVIL. Colour greenish grey to black. Occurs frequently in meadow foxtail seed from Europe. This weed has not become established in New Zealand.



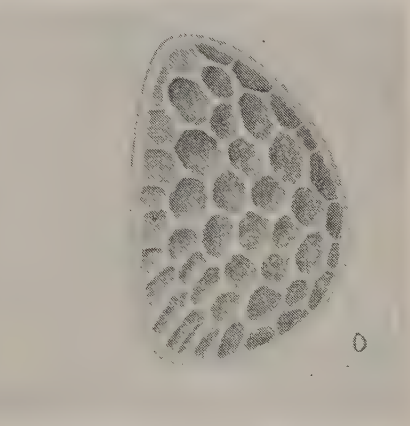
MEDICAGO ARABICA: SPOTTED BURR CLOVER; SPOTTED MEDICK. Colour yellow to brown. Occurs with medium frequency in ryegrass and red clover. An annual weed of dry open pastures. The seed pods bear hooked spines and are often found entangled in wool.



APIUM TENUIFOLIUM (A. leptophyllum). Colour brown. Occurs infrequently in white clover. An unimportant annual weed.



DICHELACHNE CRINITA. Straw coloured. Occurs with medium frequency in cocksfoot and *Danthonia pilosa.* A native annual grass common in dry situations.



RUBUS FRUTICOSUS: BLACKBERRY. Colour brown. Occurs very rarely in red clover. Australia prohibits importation.

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Poultry Keeping in Bengal

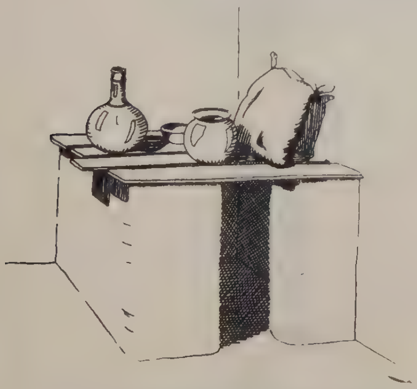
THERE is no poultry industry in Bengal such as is understood in this country, writes G. Haddon, Poultry Instructor, Wellington, who was one of the three agricultural specialists sent by the New Zealand Government to Bengal to assist in plans to increase Bengal's food resources. The bulk of the population of Bengal Province is employed in agriculture; they are the "cultivators," and the average size of one man's holding is 3½ acres, on which he has to support himself and his family of possibly six persons, and his draught animals, usually two working bullocks. Most of his holding is often under water for six months or so of the year. The average holding is so small that it cannot be worked economically, and one man's area is often scattered about in several small plots, thus preventing a useful and efficient layout.

Gallus bankiva, **the original jungle fowl, an interesting survival in north-east Bengal.**

THE population of Bengal is predominantly Muslim, and therefore allowed to eat meat, but the average cultivator cannot afford to eat much meat, though he does keep a few fowls running wild around what could be called the homestead.

Fowls on Free Range

These fowls are on true free range and roam where they please during the day, but are confined at night in a small mud-plaster pen. A typical pen is about two and a half feet square inside and any convenient height. The flat top is usually used as a store place for things which cannot be hung on the wall. The birds are crowded into the pen at night, and the small opening is then blocked up. The most usual place for this pen is in one corner of the single living room which constitutes the cultivator's home. Any calves or goats share the same room also.



Typical mud-plaster pen for poultry in a corner of the single living room of a Bengal villager.

The cultivator is too poor to buy food for his birds, and they exist on what they can find for themselves outside, though they are sometimes given a handful or so of "paddy," the unhusked rice berry which possesses an extremely hard outer covering. This husk is almost indigestible, so the birds get little nourishment from what paddy they are fed.

All livestock in Bengal suffers from protein and mineral shortage, and the poultry are no exception to this. Supplementary protein foods are scarce, and in any case the cultivator is too poor to buy them.

Actually the birds find sufficient protein foods in grubs and insects to keep themselves healthy, but not enough for heavy or even medium egg production. Should a cultivator be able to afford to purchase additional protein supplement, it is often in the form of meat offals, which have to be cooked and cut up before use, and only those who are within walking distance of a market may get such food.

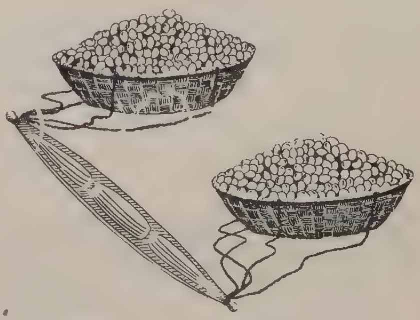
The average egg production of Bengal poultry, based on pre-war figures, was in the region of 40 to 50 eggs per bird per year. Adequate feeding with the correct foodstuffs will bring this production up to about 80 eggs per bird. However, immediately the birds return to village conditions their egg production drops to the old figure.

Egg Marketing

A Bengal family does not eat many eggs; it prefers to sell them to wandering dealers, who bulk their purchases until they have a thousand or so eggs, when they are sent to a big town, Calcutta or Dacca for instance, and sold in the public market. The eggs are all very small, averaging one and a quarter to one and a half ounces each. They are very dirty and the freshest of them about one week to 10 days old before they reach the consumer. It should be remembered that foodstuffs deteriorate far more rapidly in Bengal's humid climate than they would in this temperate climate. It is hard to say what would be the equivalent in this country of a week-old Indian egg!

The normal package for egg transport is a wicker-work basket about 3ft. in diameter and about 1ft. in depth, like a shallow bowl, and into this container the eggs are packed without any protection or packing. When the basket is full a piece of sacking is stretched over the top.

No attempt is made to keep the eggs cool during transit, and, as most of them are fertile, quite a large per-



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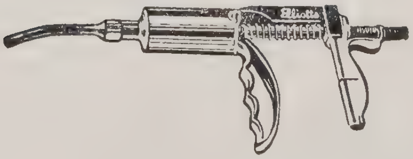

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centage of them are in a very bad state by the time they arrive at their destination. In some of the bigger markets it is standard practice for the vendors to have crude candling lamps so that the purchasers may have a chance to see what they are buying.

Poultry Stocks Decimated

The war in Burma has had a very marked affect on the poultry population of Bengal. The large military forces which have been stationed in and around Bengal for several years have been steady and large-scale purchasers of any poultry produce they could buy. The result has been a serious denudation of the poultry stocks, which has amounted in some areas to virtual extermination of the village poultry. The villager, with his philosophy of living just for the day, simply sold any birds he had, irrespective of their age or value as potential egg producers. Prices consequently soared, and eggs which in pre-war times sold for about six or eight annas a dozen (8d. to 10d.) sold for prices ranging between two and three rupees per dozen—a 400 per cent. increase in price. This sort of thing put a lot of foods normally consumed by the population out of their reach and was one of the causes of the recent famine, which was not a famine in the true sense of the word, but a food shortage brought about by a sudden and abnormal demand far in excess of the supply.

Hatching Centres Established

The Government of Bengal met this poultry shortage by establishing what were known as Poultry Multiplication Centres, five of which were scattered around the province at Ranaghat, Midnapur, Narayanganj, Jamalganj, and Dacca. The sizes varied from 40 adult breeders to 120 breeders, but one and a half years ago a large expansion of these stations was undertaken, the smallest being increased to 100 breeders and the largest to 750 breeders with two centres of 350 breeders each. All the centres endeavoured to hatch all the year round, but the climatic conditions were too hard for three months of the year during the monsoon period, so operations were restricted to a maximum of nine months of the year.

The results of this widespread hatching were then passed out to selected areas on very favourable terms to the villagers. They were not allowed, for instance, to sell stock supplied by the Government, but could sell the progeny. The result of this policy was to stop the drastic decline in numbers of poultry kept by the villagers, but only in the areas in which the scheme operated. It will be many years before the village stocks are fully replenished. Exactly how the cessation of hostilities will affect the problem is unknown, but it will definitely stop the heavy drain on existing stocks of poultry.

Breeds in Bengal

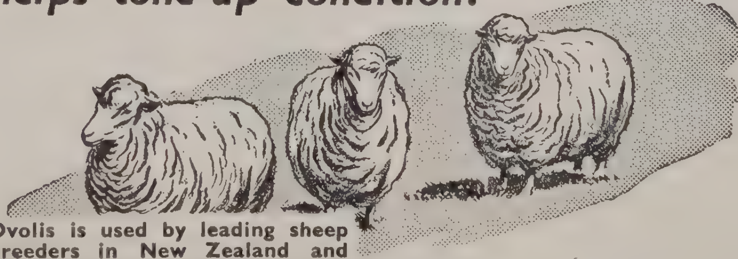
The breeds of poultry common in Bengal are primarily local ones known as "deshi," or country birds. They are small-framed, leggy, and appear in all colours and combinations of colours ranging from black to a very light brown. As may be expected, they are very prone to broodiness and lay small clutches of eggs—about three a year of a dozen eggs each clutch.

Selective breeding and mating can improve the deshi until it is capable of producing about 140 eggs per year, but only when fed and managed correctly. Immediately it returns to village conditions its production at once drops to about 80 eggs per year. Successive generations gradually degenerate, and soon the production is back to 40 eggs per year. The trouble, of course, is due to the large numbers of mongrel male birds which have been allowed to run freely. A direct method of dealing with this trouble has been evolved: Whenever stock from a Government farm is released to any district the mongrel male birds must be surrendered. In this way it is hoped to grade up the village flocks. It is a slow process and, though simple, it is one that villagers find hard to understand, as, in many instances, they do not seem to be able to connect cause and effect.

Another breed in East Bengal is the Chittagong, which comes from the hill tracts of the Chittagong district and has somehow remained pure; that is, the breeding results in type, size, and colour are consistent. It is a bigger, stronger bird than the deshi and has a typical game appearance. Its egg production is on a par with the deshi, and, like the latter, its production can be improved by selective mating and breeding. The plumage is white with a lot of brassiness in it. The leg colour varies from yellow to a mottled grey and white. The skin is hardly yellow, being whiter than a Leghorn's.

In a very restricted area of the Chittagong district there is another breed—the Atsil, or Aseel, as it is sometimes called. This bird is a definite game bird and is bred with that end in view. It is not common, as most cultivators have not the skill or interest to indulge in the ancient sport of cock-fighting.

In addition to these indigenous breeds, the Rhode Island Red and White Leghorn have been imported. On the Government farms these have been crossed with the deshi and Chittagong breeds and the crossbred cockerels issued to different districts. It was hoped in this way to preserve something of the rugged stamina and



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virility of the Chittagong and simultaneously improve the egg production capabilities of both it and the deshi. The plan succeeded up to a point, but after being bred in Bengal for many generations the imported breeds have still failed to acclimatise properly, and this weakness becomes apparent in the progeny.

This failure to acclimatise is very apparent in the pure breeds when they are seen alongside the local breeds, but becomes less marked after several crossings with indigenous breeds, by which time the benefits from the imported breeds become almost lost. However, it is probable that much future work in Bengal will be devoted to developing the indigenous breeds which are already products of their environment.

An interesting survival is still to be found in north-east Bengal, where individuals of the original jungle fowl, *Gallus bankiva*, may be seen. This bird has always been regarded as one of the original ancestors of modern poultry. Indeed, it is quite possible that the Chittagong and the Atsil are direct descendants of the jungle fowl, though it is difficult to account for the deshi bird, which is very far removed from the game type. Actually the four species of jungle fowl are still to be found scattered along an arc passing through north-east Bengal, parts of Burma, Sumatra, and Java.

No Pride of Possession

It might be wondered why the standard of village poultry is so low. Many factors have combined to make it so. For one thing, all life in India, including human life, has no value at all. Sufferings of animals are regarded with sheer indifference, except by a very small minority. The result is that the people have no real pride in possessing good quality stock just because it is good quality. In many instances they would prefer to sell a good quality animal, buy a poor quality one, and then, as far as they were concerned, they would still have an animal and some rupees in their pocket as well.

This is a very difficult mentality to combat, and it can only be overcome by long-term education and instruction. These are badly hampered by widespread illiteracy in the cultivator class, which greatly limits the scope of instructional pamphlets, as perhaps only one man in a village or settlement can read, and even then he might not understand what he is reading.

A second limitation is the villagers' deep-rooted aversion to trying out new or, to them, unorthodox methods. This is understandable when it is recognised that the villager is existing on the border-line of want, and is unwilling to forsake a method which he knows will normally provide a reasonably certain but sparse living.

Transport facilities are difficult. Away from the railways all transport is by coolie or bullock cart, as motor roads are few and far between. River and water-borne transport is available, but is slow and uncertain. Demonstration farms do well in their immediate districts, but distances and areas are so large that the surface is only scratched.

The whole problem of poultry keeping in Bengal is closely tied with the economic condition of the country. The Bengali cannot afford to keep his poultry any better than he does at the present time until his standard of living is raised, but if the standard of his poultry is raised, his standard of living will go up. The fact that at heart the Bengali does not seem to be a stockman makes the problem a difficult one.

New Zealand poultry farmers are now having difficulty in getting foodstuffs. For months the birds on at least one Government farm in Bengal were living on a diet of whole or cracked maize and ground nut cake and meat offals when the local bazaar had any for sale. Within the last year these farms had to indent six months ahead for their food supplies. That meant that twice a year six months' supplies were on hand. The condition of such food towards the end of each period may be imagined.

There were two reasons for this, the extreme difficulty in obtaining any supplies at all and transport exigencies, neither of which obtains to such an extent in this country. New Zealand farmers do not have to contend with temperatures ranging around 100°F. and high humidity for months on end. Snakes, wild cats, jackals, kites, crows, and mongooses, which all prey on poultry, are not found in this country; and how many poultry farmers would care to employ a night watchman as a normal safeguard against thieves?

◆

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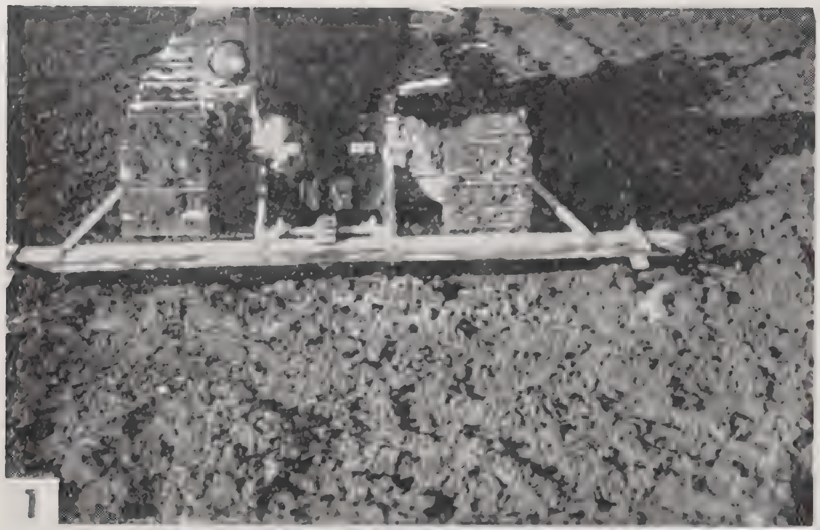
HITCH FOR PULLING TWO



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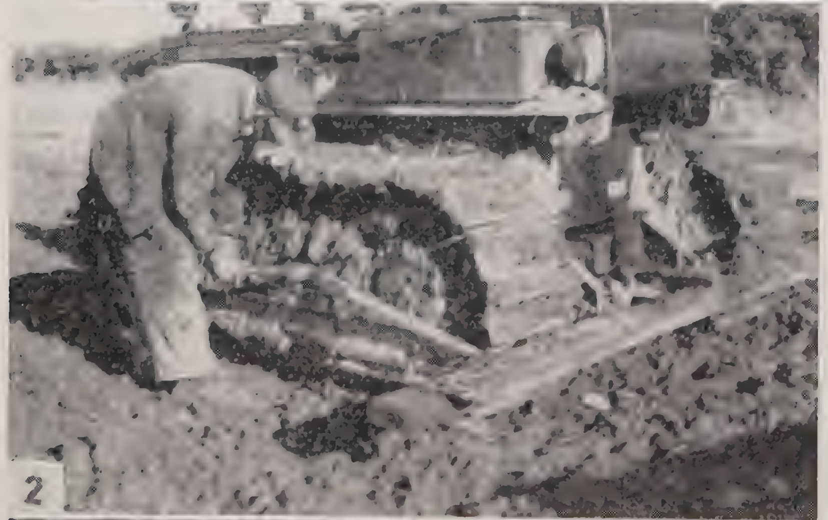

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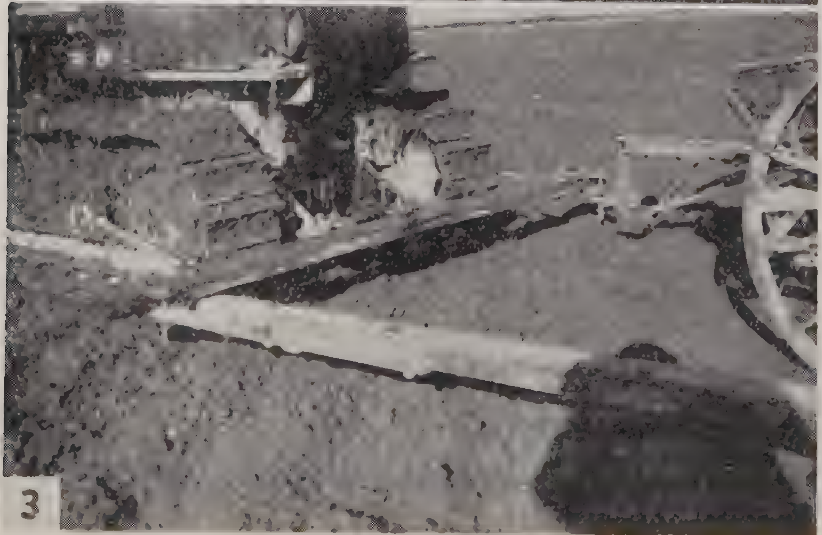

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A PHOTOGRAPH of a tractor pulling two drills on the property of Mr. L. A. Watson, Methven, which was reproduced in an article in the February, 1945, issue of the "Journal" ("Seed Certification: Activities in Ashburton County") has elicited several inquiries from farmers requiring details of the hitch used. In this article G. K. McPherson, Instructor in Agriculture, Ashburton, who was the author of the original article, describes the hitch and the advantages of its use, and the photographs show the hitch in operation.

Mr. Watson farms a property of 2,100 acres of flat to slightly undulating land, with the size of the paddocks under cultivation varying between 50 acres and 200 acres. Some years ago it occurred to the owner that the drilling of large areas would be considerably expedited if he could construct a satisfactory hitch which would enable his tractor to pull two drills. Two drills operated separately require two tractors and four men; operated as a unit, under good conditions, the job could be done with one tractor and two men.

Mr. Watson originally tried each drill with forecarriages and the back drill pulled with a long chain. This idea, however, was very unsatisfactory, as the back drill would not track properly on ground which was not quite level. It was therefore decided to try direct hitches, which proved very satisfactory, as the back drill tracks perfectly under all conditions.

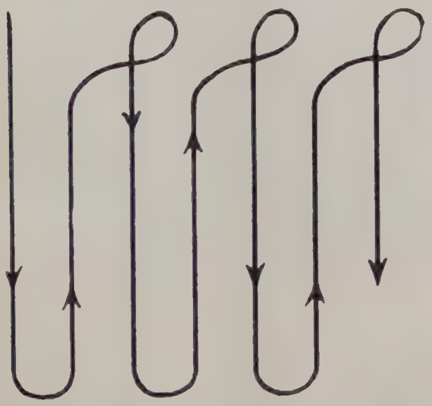
The series of photographs accompanying the article illustrates clearly the method by which the drills are hitched to the tractor. Attached to the tractor is a bar of 6in. x 3in. hardwood reinforced with a 2in. x $\frac{3}{8}$in. iron plate in front. This bar, which is the same length as the width of the drill, is bolted to the tractor in five positions so as to make it absolutely rigid.

1. Drawbar attached to tractor.
2. Staying of drawbar to tractor.
3. Front drill attached to drawbar.

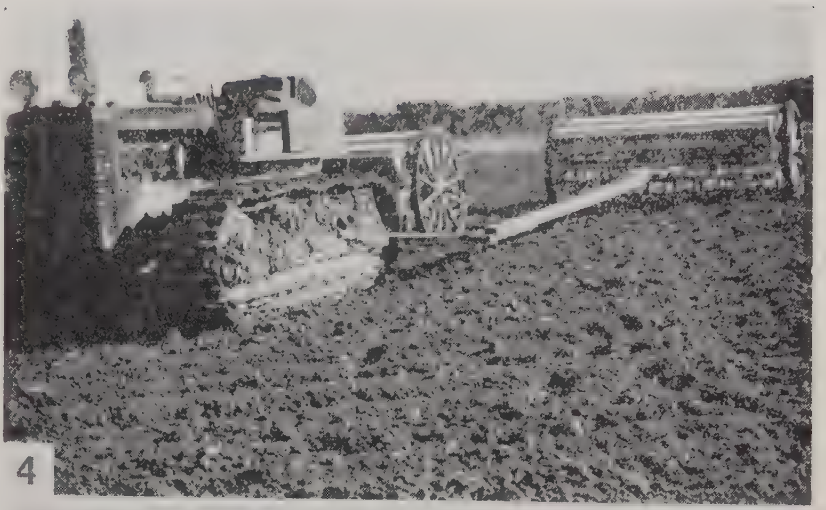
DRILLS WITH ONE TRACTOR

The bar from the back drill to the tractor bar is also 6in. x 3in. hardwood reinforced by iron plates, 2in. x $\frac{3}{8}$in., one on each side. Where it is intended to use harrows the length of this bar should be made to give a 14ft. 4in. longer pull than on the front drill.

To facilitate turning a fairly large headland is necessary. Before commencing drilling up and down the paddock Mr. Watson drills six widths around the paddock, or the equivalent of 12 widths of one drill. With the hitch described turning to the left can be made at a sharp angle; to the right an angle of about 45 degrees is all that it will allow. The diagram illustrates the method of turning at the headlands. The arrows show the direction of the pull.



Mr. Watson operates a 17-coulter and a 15-coulter drill, and under average conditions it is usual to drill about 60 acres per day. On one occasion 2 men drilled 320 acres of wheat (one paddock) in $5\frac{1}{2}$ days. For drilling turnips and rape and for any other light drilling the two drills could possibly be hitched to a heavy-wheeled tractor, but for heavy drilling, such as wheat or oats, it is doubtful whether the wheeled tractor would pull the two drills satisfactorily.



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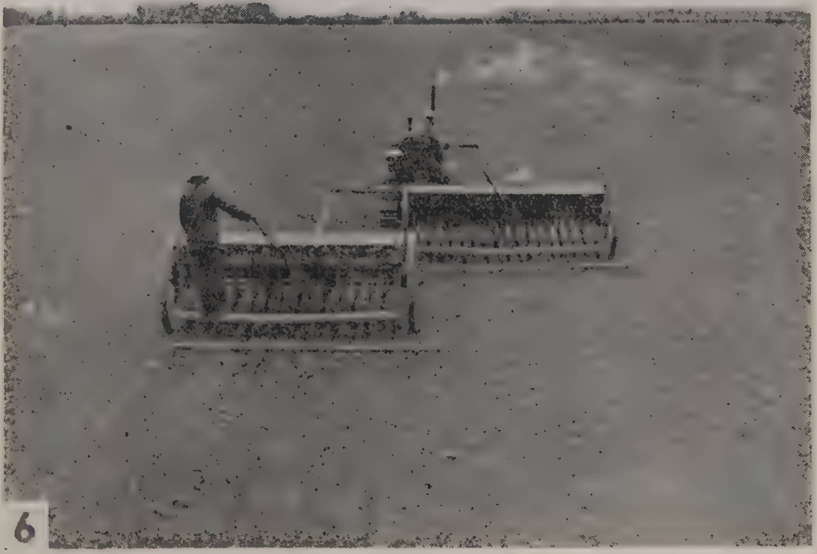

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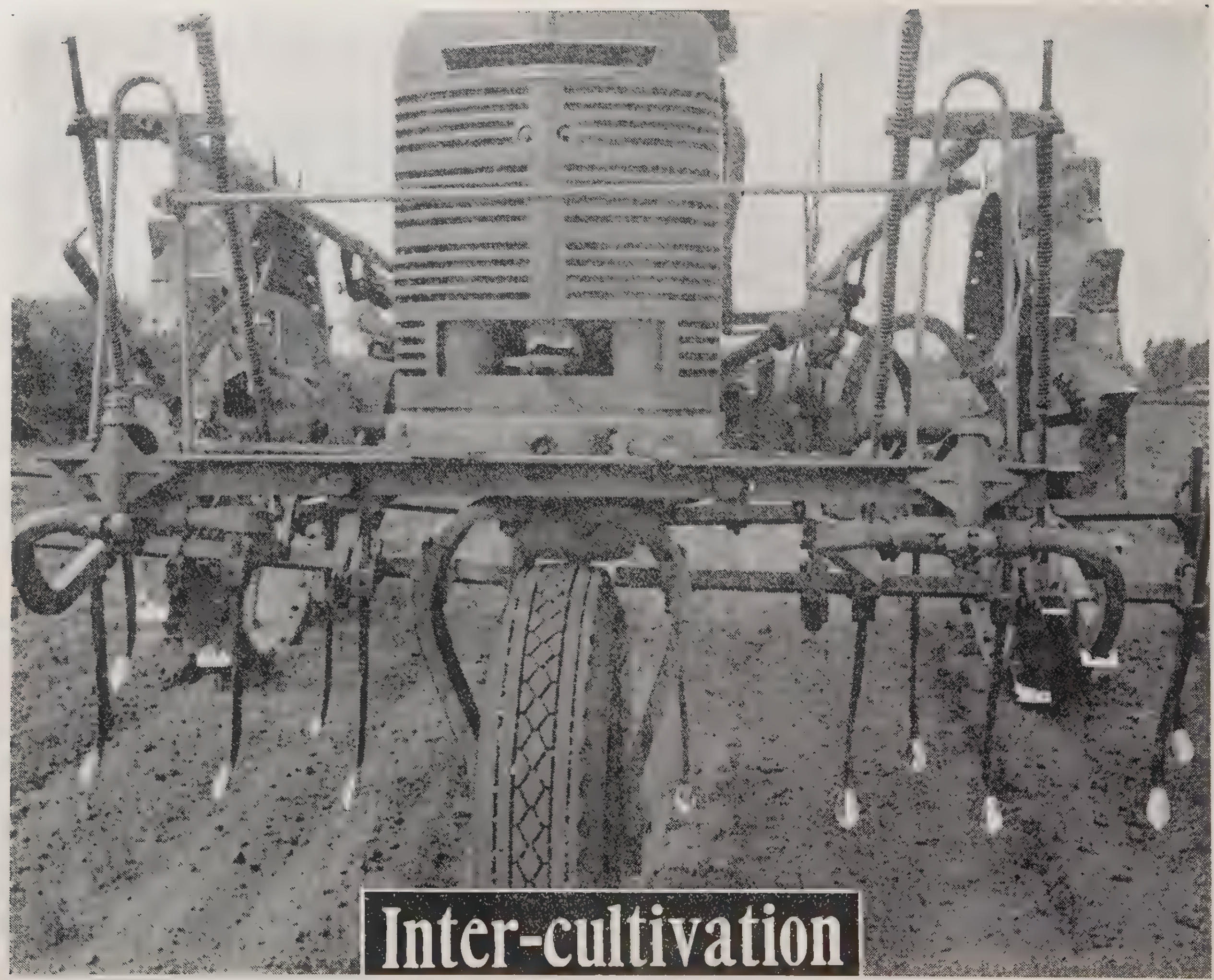
4. Back drill attached to drawbar.
5. General view of tractor, drills, and harrows.
6. The two drills operating.



Inter-cultivation

Maximum crop yields can be achieved only by giving due attention to the growing crop, and thorough inter-cultivation during the growing period pays handsome dividends. Mangolds, carrots, maize, potatoes, swedes and turnips, and other crops in wide drills all respond to inter-cultivation.

1. Start inter-cultivation as soon as the rows can be seen and the condition of the soil will permit.
2. Cultivate lightly at first and keep the soil crust broken and germinating weeds under control.
3. In a dry season inter-cultivation helps to retain soil moisture, while in a wet season such work as can be carried out helps soil drainage.

The first few tons of a crop go to pay the cost of production; the last few represent the profit—increase the last few by inter-cultivation.

SEASONAL NOTES

Weeds an Agricultural Liability

PLANTS are weeds when their presence results in wastage and financial loss. Weeds of arable lands become desirable plants under different circumstances; *Poa pratensis*, for example, is valuable on steep hill country; Yorkshire fog is useful in breaking in swamp country; sorrel, yarrow, and soft weeds on much poor land are the principal feed available for sheep.

Actually only about a dozen out of nearly 600 "weed" species are native to New Zealand, and many are more aggressive here than in their native countries.

Perennial weeds include some widespread and extremely difficult species to eradicate, such as manuka, fern, rushes, docks, and twitchy plants such as Californian thistle, couch grass, and browntop.

Biennial weeds such as Scotch thistle are more easily controlled, because they form seed stalks only in the second year.

Annual weeds, which affect early establishment of annual and also perennial crops such as pasture and lucerne, are dependent on prolific seeding and ability of the seed to germinate after long dormant periods.

Systematic Suppression

Weed suppression requires well-timed, systematic effort by widely different methods, according to the characteristics and growth forms of the plants. Much farm land has deteriorated through lack of weed control. Land with a high weed seed content may produce a weed crop every time. "One year's seeding means seven years' weeding" is often an understatement of fact.

Manuka and second growth generally may be very difficult to eradicate on poor unploughable land, besides being too costly to undertake where only a low limit of return is possible. Stock manipulation may be the main factor in control with such weeds as bracken fern, bidi-bidi, and ragwort. Generally, encouragement of more useful species and more vigorous competition through efficient grassland management is a potent factor in weed control of pastures.

Spring and summer annual weeds, such as fat-hen and spurrey, are less prevalent in a first crop after grass, or in an autumn sowing. Docks, however, will establish better in autumn-sown pasture, as grass growth is checked in winter.

Fodder crops such as oats, red clover, and rape are useful smother crops, suppressing many weeds maturing in harvested cereal crops.

Following early preparation for sowing, successive crops of germinating weed seeds in the surface soil are readily killed by periodic harrowing during suitable weather. This lightens the work of after cultivation and with broadcast crops may be the only means available.

Inter-cultivation for Row Crops

Row crops especially require to be kept clean in the early stages by hand hoeing and inter-cultivation as required, so that they will not be smothered. Because they are sown early, the early growth is slow, and no dense cover is formed by the leaves, mangolds are perhaps the least satisfactory of the cleaning crops on weedy ground, unless they receive adequate attention.

With row crops early cultivation should be wide and of sufficient depth, but as roots develop widths cultivated must be narrowed to avoid injury. Adjustment for a wide range of crops and row widths is readily made with modern tractors and implements now in common use.

Every care should be taken not to disseminate weeds round the farm by feeding weedy hay, allowing weeds to seed unnecessarily, or by sowing weedy seed. Even a 2 per cent. weed content in a pound of white clover seed means about 18,000 weed seeds, while 1 per cent. of docks in an ordinary sowing will produce about 10 docks to the square yard.

Probably the greatest general loss to agriculture is due to weeds.

Grass and Clover: Seed Crops

THE New Zealand grass and clover seed production for 1943-44 was 13,700 tons of seed from 141,700 acres. Seed areas in the North Island accounted for less than 8 per cent., while Canterbury alone grew 56 per cent. of the total acreage, including 60 per cent. of the cocksfoot seed area, 67 per cent. of ryegrass, and 72 per cent. of clovers. Of the total seed production Canterbury produces 58 per cent. Seeding of chewings fescue, dogstail, and also most of the remaining cocksfoot is confined to Southland, while Otago saves most of the browntop seed.

During the war England and Australia were unable to obtain pasture seed supplies from European countries, and in 1939-40 2,000 tons of seed were exported from this Dominion. By 1943-44 seed exported had increased to 5,300 tons, valued at nearly £1,000,000. With the prospect of post-war competition, some difficulty may be anticipated in retaining these markets, and every endeavour should be made to maintain strain and seed quality at a high level and at competitive prices. Although some 600,000 acres of grassland are annually resown in New Zealand, lines of seed of low purity or germination may be difficult to sell in seasons of low export demand.

Although some growers are able to make seed crops a main objective, in most cases seed production is of secondary importance to the carrying of livestock, surplus growth of pasture

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or clover being frequently saved for seed as a catch crop.

Good second-class land in the mixed farming districts of the South Island, which normally enjoy dry harvesting conditions so essential to successful seed growing, can produce good, clean, standing first-harvest crops with small bulk of herbage. Highly-fertile soils, particularly in a wet season, not only promote rank growth liable to lodge, but induce uneven and prolonged ripening of seed, which adversely affects quality. Under such conditions, which are more general in the North Island, grazing or haying provides a more assured and satisfactory utilisation. Ample summer soil moisture is required for good yields of cocksfoot grown for seed, while in the main these seed areas receive little or no grazing.

Ryegrass

Ryegrass saved for seed in 1943-44 amounted to 56,276 acres of perennial and 11,096 acres of Italian. H1 ryegrass, which promises to be extensively grown when more seed becomes available, should more adequately cater for the requirements of the arable short-rotation pasture lands. Ryegrass autumn sown with white clover is usually saved for seed in the following summer, and white clover is often harvested the following year. One of the main considerations influencing yields is the time of closing. On light land and in dry seasons closing about the first week in October is usual, but on heavy rich land closing may be up to a month later, especially with vigorous first-harvest crops liable to lodge. Before closing growth should be evened up—but not bare grazed—by concentrated stocking for a short period. This will give even consolidation, which, with dung spread by harrowing, will stimulate the crop.

Usually as pastures age yields of ryegrass seed decrease, and weeds increase, resulting in heavier dressing losses. With heaviest yields of clean seed, first-harvest crops are generally the most payable. Normally ryegrass is left out for about 10 to 14 days before threshing, and heavy rain may cause some loss of seed in the windrow, with harvest difficulties also increased by new growth.

Direct heading of light crops on light dry soils is also carried out to a limited extent, but seed must reach a fairly ripe stage, and may require conditioning in half sacks exposed to the drying influences of wind and sun.

Blind-seed Disease

A common cause of low germination in perennial ryegrass is the blind-seed fungus. Pre-harvest examination of samples forwarded by growers to the Seed Testing Station at Palmerston North, which is made free of charge, should prove of assistance to farmers

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(1) Utilizing the available fertilizers to the best advantage by maintaining their best pastures in a highly productive condition.

(2) Making sure that the acreage being closed for hay and silage is ample for the number of cows to be wintered.

(3) Making provision for some additional Autumn fodder such as turnips, oats, barley or maize, or having extra silage for Autumn feeding in case the Summer is drier than usual.

(4) Feeding those few extra heifers particularly well to ensure their growing into high-producing cows.

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with doubtful crops in deciding whether to cut for hay or to save for seed. In collecting a sample, ensure that it is representative of the crop by collecting single heads at random while walking through the crop until about 300 heads are obtained. The primary infection occurs during flowering from spores produced on dead, infected seed in which the fungus has remained dormant over the winter.

One sample may be submitted three weeks after flowering and another immediately before cutting. An estimate of germination capacity is given with the late sample. Wet conditions prolong the period of seed ripening and favour spread of the disease. If disease incidence is high, still further reduction in germination may be anticipated with wet weather after despatch of a sample.

White clover is often a chance crop and areas for seed are usually shut up about the middle of November, or on heavier land early in December. The crop is ready for cutting when 80 per cent. of the heads are brown, and if weather conditions are good, it may be threshed from the swath with a pick-up attachment on the header. If it is necessary to stack, a clover huller is best adopted for threshing.

Broad red clover for a seed crop is usually closed in early December, and Montgomery red clover about the middle of November following grazing. Due to late ripening, districts with a late, wet autumn are not suitable for Montgomery red clover seed production, as crops are not usually ready for threshing until about the middle of March or into April, depending on conditions.

Merchants generally buy seed today on a basis of strain, purity, and germination after machine dressing has been completed.

To obtain good seed quality the growers must pay careful attention to good harvesting technique. As much as possible the aim is to:—

1. Cut crops only when sufficiently mature;
2. Lay windrows for maximum drying and even flow into the header;
3. Avoid threshing when crop is not in a fit state. The seed from crops threshed when damp or out of condition is easily damaged, hard to separate, and liable to heat in the sacks;
4. Make no attempt to obtain a machine-dressed sample off the mill or header by high drum speeds, closely-adjusted concaves, or using too small finishing riddles. Such adjustments in threshing are liable to bruise or break the seed, and tend to remove tails and wings from weeds such as hairgrass and goosegrass present with ryegrass. Weeds in this condition cannot all be removed in seed dressing, and a high purity standard may be impossible of attainment. In 1943-44 20 per cent. of the red clover lines dressed were below the export purity standard of 98 per cent., because of cracked and broken seed alone, which clearly indicates the need for far greater care in threshing.

The Department of Agriculture certifies specially-selected strains of the more important pasture species, with the result that the proportion of inferior seed sown and harvested annually is decreasing. Certified seed is usually classified into four groups for each species.

1. Government Stock seed from specially-selected strains.
2. Pedigree seed—the product of areas sown with Government Stock seed.
3. Mother seed from areas sown in Pedigree.
4. Other seed certified after laboratory testing or grown from Mother seed.

Although certified seed must comply with certain minimum standards of purity, certification guarantees strain quality only, but the true value of different lines varies according to the purity and germination. As an official purity and germination certificate covering every sack of certified seed is always issued, no seed should be purchased without reference to this certificate.

For those undertaking seed production Government Stock, Pedigree seed, or Mother seed should be used. For ordinary use Permanent Pasture or Commercial seed is recommended.

Hay

APPROXIMATELY 75 per cent. of pasture hayed annually in New Zealand is in the North Island. Greater reliance is necessarily placed on production of extra hay from crops such as lucerne, clover, and oats with peas or vetches, and on chaff to supplement forage crops for the heavy winter feeding required in the South.

The saving of spring pasture growth for silage before the haymaking period, which is common in the North Island, is not carried out to any extent in the South, because in the latter the spring flush is later, and may be harvested at a time when weather conditions are generally suitable for haymaking.

The aim in haymaking must be to obtain quality as well as quantity. This is not possible by haying very inferior pasture capable of producing under the best conditions only unpalatable material of low feeding value and frequently heavily infested with weed seeds.

Because haying of pastures tends to leave swards more open, shutting up the same areas year after year encourages tall-growing grasses, such as cocksfoot, at the expense of bottom grasses and clovers. It is usually de-

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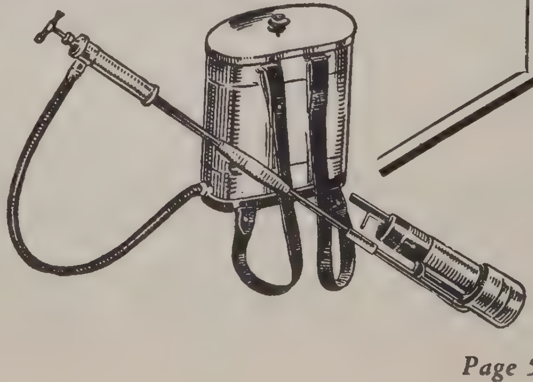

sirable to maintain even swards suitable for grazing, and rotation of paddocks for haying should be adopted as much as possible.

Time of Cutting

The important points affecting cutting are the stage of maturity and the weather conditions. Under very dry conditions pasture growth makes little headway, and matures very rapidly, but under damp conditions maturity may be delayed with continuance of succulent growth. The best time for cutting mixed pasture is at the stage when the bulk of grasses are in flower. Quality is then high and quantity is approaching the maximum. After this period decline in quality may be rapid, especially in dry weather, as the nutrients are used for seed formation at the expense of the plant, which becomes fibrous.

Clover crops or oats and vetches are best cut when partly in flower, but oats alone when in the milky stage. Lucerne is cut when young shoots come away from the base of the plants. Delay in cutting results in deterioration of the old growth and shading of young shoots, many of which may be cut off by the mower and the next cut retarded. Whether for hay or silage, only as much should be cut at one time as can be conveniently handled by the labour and equipment available. If some of the area for hay is cut on the early side, the risk of weather damage is spread, while over-maturity of herbage is less likely to occur. Advantage should be taken of the daily official wireless weather reports so that appropriate action can be taken, especially when the hay has become practically cured and is liable to most serious damage from rain.

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Curing

Newly-cut herbage contains about 80 per cent. moisture, and this is reduced to about 18 per cent. in haymaking.

Treatment will depend on weather conditions, the kind and density of the crop, and the equipment and labour available. The aim is to obtain quick, even drying, while retaining colour and aroma in the hay. Following a spell of dry weather, both the herbage and the ground are drier —a condition which reduces the time the hay is out. Every advantage should then be taken of the drying conditions that Nature provides. Heavy crops should be dealt with in the swath, lighter crops in the windrow. Wind is a better drying agent than the sun, and the hay should be loosened up with tedders, swath turners, side-delivery rakes, or by hand to take advantage of every breeze that blows. In sunny weather hay should be turned in time to prevent bleaching of the grass and scorching of exposed clover and lucerne leaves, which will rapidly dry out, become brittle, and drop off in handling, leaving the stems still succulent and the hay difficult to cure.

If weather becomes threatening hay should be cocked, reducing the area exposed to about one tenth. Well-made grass cocks will turn rain well, and the best hay is made this way, but to reduce cost cocking is generally dispensed with, if possible. Clover and lucerne haycocks do not turn heavy rain, and the crop is usually baled or stacked from the windrow, but loss after rain from these crops is high.

Experience is the best guide for fitness of hay for stacking or baling, but sap should not appear if the hay is twisted tightly. Heat will generate if material is not fit, and charring or spontaneous combustion may occur. Hay also is liable to turn mouldy if damp. Fine agricultural salt at about 15 to 20lb. per ton will assist final curing and improve palatability.

Stacking

Choose a dry site for stacking, reasonably free of fire risk, and consider convenience for feeding out as well as for building. Build on a good foundation of logs or straw to exclude ground moisture, and make sure the hay is fit. A stack may conveniently be built to form a quarter circle with the convex side facing the prevailing wind. Labour may be saved by employing a mast and boom, or fork type hoist, which will deposit the hay where required. The stack should be well hearted with hay, evenly spread and consolidated.

Side-delivery rake used as a swath turner on a hay crop, a third of the tines having been removed to allow only sufficient width to feed comfortably without jamming the mouth of the pick-up baler.

Baling

Many farmers are prepared to bale hay rather than stack, but in either case the hay must be fit; otherwise, if the bales are stacked immediately, excessive heating may develop. In most cases, if weather permits, lucerne hay bales should be left out overnight for further curing before stacking. Hay should not be baled if it will not run cleanly over the machine. Lucerne cut late in the season is more difficult to bale, and bales may be stacked too soon. Every care must be taken to prevent their becoming wet, and bales left in the paddock should be stooked. Many thousands of bales were wasted last season because they were left lying flat on the ground during wet weather.

The stacks should be conveniently placed for winter feeding and built on a dry site, utilising logs and straw for the bottom. Outer walls should be vertical and closely packed to exclude air, with bales interlocking over the layer below. A roofed shed or Dutch barn affords excellent cover, but if an outside stack is built, the top should be ridged and well capped with hay to withstand heavy rain.

Baled hay is easy to measure in feeding out. With sheep it is not necessary to break up the bales, but when feeding to cows distribution is necessary. With the greater efficiency of modern baling devices on the market, baling is increasing in popularity, but if contractors are depended on, unwarranted risk should not be incurred by leaving the hay too long in the windrow waiting for the baling outfit.

Irrigation

EARLIEST records of irrigation in New Zealand trace back to the old goldmining days in Central Otago, where, under an annual rainfall of only 10 to 15in. per annum, production without irrigation is normally low and conditions arid. In this district over 70,000 acres, mainly permanent pasture, are irrigated annually, maintaining a high carrying capacity and producing heavy hay crops of grass, clover, and lucerne. In favoured localities extensive orcharding is also carried out under irrigation.

The recent development of irrigation in Mid-Canterbury promises to bring stability and enhanced production to a large area of light plains land at present under the constant necessity of pasture renewal and cropping. Large areas of rape and turnips, often doubtful crops, are required for feeding and building up sufficient fertility for grain crops.

The humus content and consequently the moisture-holding capacity of these soils is low, while the drying northwest winds frequently experienced over the spring and summer may cause both crops and pasture to suffer.

Under irrigation fertility of the soil can be built up through permanent pastures with high stock-carrying capacity. This will result in less dependence on special cropping, whether for stock feed or for grain. Should such areas be cropped subsequently, the increased fertility would induce heavier yields.

Early Autumn Sowing

Under irrigation early autumn sowing of pasture and lucerne is preferable to spring sowing. Following a spring sowing the ground is not well consolidated when irrigation is needed. The soil to the depth of the ploughing tends to puddle and after drying out is liable to bake and crack badly. Early autumn sowings will develop stronger rooting systems, which bind the soil better. The texture of the soil also will be in better shape physically for early summer irrigation, following natural consolidation over the winter-early spring period.

For grazing purposes or for hay crops of grass or clover strong growth of herbage is the objective, and free and frequent use of irrigation water is made, but in cases where such crops are being saved for seed a large bulk of herbage is not desirable, and irrigation, if carried out at all, should be sufficient only to maintain the crop in a healthy state. In addition to increasing growth, irrigation tends to induce a long flowering period with less prolific seeding, and poorer samples of seed are likely to eventuate.

Pasture Irrigation

The method of irrigation adopted for pasture depends on circumstances, but the following are most common:

The Border Dike System: This is adaptable to even ground with a fall up to 1ft. per chain, but, while expensive to lay down, it is eventually the most economical method in water and labour. Early preparation begins with the ploughing, which, along with subsequent cultivation, is carried out in the direction of fall to facilitate irrigation and drainage. For up to 4 cusecs of water check banks or dikes are formed at intervals of ½ chain or less, down the paddock for distances from 5 to 7 chains, but preferably not too long for efficient irrigation.

About 8 cusecs of water are made available under the irrigation scheme in the Ashburton County, dikes being constructed about 40ft. apart, and up to 10 chains long under average conditions. To allow for consolidation and reduction by stock, the dikes should be made high enough to remain effective for a number of years. Some farmers roll across the dikes for consolidation, burial of stones, and to leave a rounded profile, which will facilitate harvesting operations later.

The Border Ditch Method: This is frequently adopted when the fall is over 1ft. per chain or the ground is uneven. Water from the head-race, instead of being confined by dikes, is distributed from border ditches, usually by damming with a canvas sheet from various points.

Contour System: When the fall is considerable irrigation races follow contour lines, allowing a fall of 3in. to 4in. per chain. Distribution of water from the races is carried out from appropriate places, and water allowed to trickle downhill, where it may meet a lower contour race. Much of the land in Central Otago is irrigated in this manner.

Wild Flooding: In this system water is directed with the aid of a shovel from higher ground to cover the area as evenly as possible. Old channels will simplify subsequent irrigations.

Water for Crops

Annual crops such as wheat, oats, barley, and peas are seldom irrigated. As has been mentioned previously texture is affected adversely with early summer irrigation following spring sowings. With autumn-sown crops, although the ground is better consolidated, irrigation is scarcely required, and if carried out, is liable to induce second growth with pinched grain, thereby spoiling the sample.

Ridged crops, such as potatoes, mangolds, swedes, and carrots, may be irrigated by running the water down the furrows as required. If necessary to promote germination, irrigation water flowing down the furrows will spread by capillary action to the seed in the ridges. The fall should be only slight, and where necessary the drills should be made across slopes to reduce fall with risk of scouring. As soon as the ground is sufficiently dry surface mulching should be undertaken to reduce evaporation.

Water-holding Capacity

As there is a wide variation in the water-holding capacity of soils and subsoils, this has an important bearing on irrigation practice. To obtain a high duty of water and most benefit from irrigation only sufficient water at a time to meet the needs of crops up to the capacity of the soil is the aim as far as is practicable.

Naturally fine-textured soils retain more water than coarser soils, such as sands and gravels, which require more frequent irrigations, well judged in quantity, but with a building up of the humus content of the soil water will eventually be better held. A deep soil will absorb and hold a greater quantity of water, but a gravelly subsoil, while ideal for drainage, may occasion much loss of soil nutrients under too heavy irrigation. A pan will restrict downward movements of water, the soil under irrigation tending to a waterlogged condition.

Evaporation from wet soil surfaces may be very high, but is greatly reduced where the sward forms a good cover, and the moisture passes through the crop.

—*E. M. BATES, Instructor in Agriculture, Alexandra.*

For a fuller account of irrigation practices the reader is referred to the article by G. G. Calder in the July issue of this Journal.

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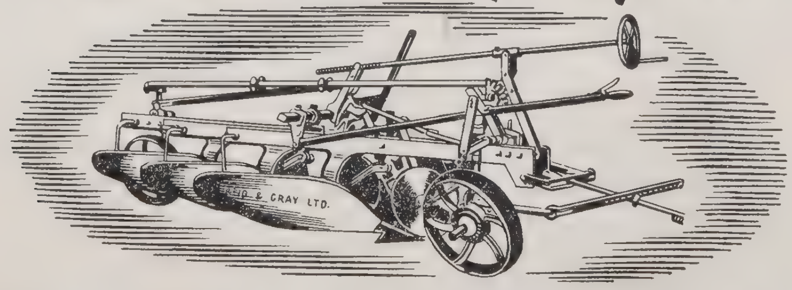
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ORCHARD AND VINEYARD

Spraying and Thinning

DURING December the most essential orchard activities connected with the production of the fruit crop are disease control, cultivation, and thinning.

Spraying operations for December should be continued as outlined in previous notes. Apple and pear trees having produced a fair amount of foliage and shoot growth, complete coverage with spray will be more difficult, but a little extra time spent to ensure that all parts of the tree receive a thorough coverage will be well worth while. It is important that a good pressure be maintained, especially if the trees are inclined to be dense. Notwithstanding warm, dry weather conditions which may prevail, the period between applications of both insecticidal and fungicidal sprays should not be lengthened beyond the time for which they are effective.

The most troublesome of the insect pests at this period are codling moth, red mite, leaf hopper, and pear slug, and a renewal of sprays is necessary on pip fruit at from 14- to 18-day intervals to guard against these pests. Any fruit infected with codling moth should be scrupulously gathered and destroyed. Red mite can be fairly well controlled where lime sulphur is used throughout the season. However, where colloidal sulphur has been used in place of lime sulphur, red mite frequently increases to such an extent that it becomes necessary to resort to special treatment. Summer oil at a dilution of 1-100 has proved very effective in the eradication of pests such as red mite. Should leaf hopper also be troublesome at the same time, nicotine sulphate should be added at a strength of 1-800. To obtain the best results this application should be repeated 10 days later.

If weather conditions are favourable for the development of brown rot, the spraying of stone fruit should be continued. For the control of pear slug cherries and plums may require two applications of lead arsenate.

Thinning

Most of the natural dropping will have taken place by December and a fair idea of the size of the crop can be obtained. It should be remembered that the demand for small fruit is very limited; the picking, grading, and packing costs are greater than with medium and large sizes, and there is usually a larger percentage of rejects. If careful thinning of the crop is carried out, a better average size is produced, the weight is more evenly distributed over the tree, better results are obtained in disease control, handling costs are reduced by eliminating undersized fruit, the tree will produce more growth, and the tendency to alternate cropping will be lessened. Much of the benefit of thinning is lost if the fruit is allowed to develop too large in size before the surplus fruit is removed.

Most varieties should receive two thinnings and in some instances, particularly under droughty conditions, it would be advantageous to give three. Judgment is required in deciding what number of fruits should be allowed to remain on the trees, and where there is a heavy setting to choose from apples and pears should be reduced to one to a spur at least. Care should be exercised in spacing of short-stemmed varieties, otherwise stems of remaining fruits may be fractured and would probably fall before they reached maturity. In thinning all distorted and disease-infected fruit should be discarded.

Cultivation

As opportunity offers cultivation should be continued in order to suppress weeds and conserve moisture. If this work is not given sufficient attention, severe dropping of fruits will often result during November and December.

—*D. J. HOGG, Orchard Instructor, Mapua.*

Citrus Notes

Harvesting Time Important

IT is not easy to determine the correct time to harvest sweet oranges, mandarins, and grapefruits, all of which are liable to lose a portion or all of their juice if allowed to remain on the trees too long. The period after the fruit becomes fully sweetened and before loss of juice commences varies greatly with the kind of citrus, variety, season, tree vigour, crop, and age of trees. It is, therefore, not possible to lay down any rule for time of picking.

Among the factors which tend to hasten the loss of juice are young trees, trees with more than normal vigour, poor strains of a variety, light crops, and early commencement of warm weather. Some varieties are more prone to earlier loss of juice than others. Conditions favouring the retention of juice in fully-matured

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fruits include relatively dry periods, old trees, heavy crops, and trees with less than normal vigour. Most varieties of mandarin commence to lose juice about 10 days after attaining full flavour and sweetness, and, as the whole crop on any tree does not mature simultaneously, several pickings are necessary at weekly intervals. The fruits with the deepest colour are generally the most mature, but frequent sampling is necessary to avoid picking fruits that are not fully sweetened.

Oranges seldom commence granulation (drying out) until 3 to 4 weeks after the fruit is fully matured, and then only where there are several contributing factors or a particularly susceptible strain or variety. For instance, the Navelencia variety is generally among the first to lose its juice, whereas late-maturing varieties such as Valencia and Lue Gim Gong generally retain their full juice content for 6 to 8 weeks after reaching full maturity. However, the fruits of these varieties that mature later than the normal period may commence to lose their juice even before the fruit has become fully coloured. In some orchards during the past season granulation in late maturing Valencias was observed in November, but in other orchards this condition did not develop to any appreciable extent until January. These facts demonstrate the need for frequent checking of juice content to ensure that fruits are not allowed to remain on the trees too long.

The Marsh's seedless grapefruit attains dessert quality later in the season than any other variety of citrus. The flavour of this variety continues to improve up to December and at times even later in the season. Seldom does this fruit dry out appreciably before the end of the year, and fruits picked in January or even February are generally still in satisfactory condition. To pick the fruit in late December, as is recommended, will result in some wastage from windfall fruits, and the late picking date tends to reduce the setting of next season's crop, but the general unsuitability of Marsh's seedless grapefruit for dessert use earlier in the season leaves no other satisfactory alternative.

Citrus Canker

Growers should be constantly on the look-out for infection by citrus canker, which is claimed to be the most dreaded disease of citrus. All kinds and varieties of citrus are liable to become infected, and the possibility of the appearance of the disease at any time in any locality should not be lost sight of. Early detection of the disease may obviate the need for the complete destruction of an infected orchard. The harvesting of the crop presents an excellent opportunity for a careful examination of each tree. Any spots that are thought to resemble citrus canker even slightly should be immediately reported to the Orchard Instructor for the district.

The disease takes the form of circular brown spots varying in size up to about a quarter of an inch in diameter. The spots, which are slightly raised, appear on fruit, twigs, and both sides of the leaves. A bright yellow "halo" invariably surrounds the spots on the foliage on lemons, but is less conspicuous on oranges. The circumference of the spots or "cankers" normally has an oily appearance, especially during the summer and autumn, when the outer yellow "halo" is also most sharply defined. Healthy trees are perhaps more likely to become infected than are weaker ones.

Colouring Oranges

It is general in late-maturing varieties of sweet orange, notably the Valencia and Lue Gim Gong, for an appreciable percentage of the crop to mature so late in the season that it fails to colour satisfactorily on the trees. While such fruits seldom develop a flavour equal to the earlier-maturing fruits of the same variety, many become marketable if coloured in storage. To bring out the full orange colour without causing excess wilting the fruit should be stored in a cool place in cases with close-fitting boards and a covering placed over the fruit in the top cases to reduce excessive ventilation. Most sheds with an earth floor are suitable places for storage, whereas concrete or wooden floors tend to cause excessive wilting. It is also satisfactory to store the fruit outside if the cases are completely protected from the sun. It is neither necessary nor desirable to exclude all rain from the cases. Under suitable storage conditions fruits picked in December with little or no orange colour showing will become fully coloured in about 4 to 6 weeks from the time of picking.

—P. EVERETT, *Orchard Instructor, Kaikohe.*

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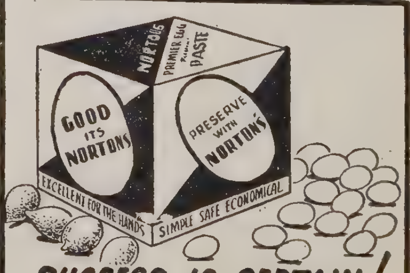

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HOME GARDEN NOTES

Work for December

IN December seedlings of most of the autumn- and winter-maturing vegetables should be planted out in the place where they are to grow to maturity. With brassica (cabbage, etc.) varieties strict crop rotation and regular liming of the areas where such crops have been grown the previous season are recognised cultural practices to prevent the development of club root, a fungous disease which thrives under acid conditions of the soil. One of the principal results of mixing lime with the soil is the neutralising of acidity, sometimes called "sweetening" the soil. If autumn and winter supplies of these crops are to be grown—and their production is very desirable—the above recommendations should be adopted.

During late November, and before setting out, the seedlings should be given the attention necessary to produce strong, vigorous plants, for only the best plants can survive the shock of transplanting during the dry conditions and high temperatures usual in December.

Soil Preparation

Trenching is recommended when digging the ground in which autumn- or winter-maturing crops are to be grown. Well-rotted stable manure, farmyard manure, or properly-made compost may be mixed with the bottom spit of soil. The use of fresh cow or pig manure on heavy soils should be avoided. During a dry period of the growing season the manures mentioned above, or compost, will retain abundant moisture, which, with watering, will provide conditions suitable for continuous plant growth.

Cabbage (Early Savoys)

Early Savoy cabbages are the first of the autumn-maturing crops which should be attended to, as they fill the gap in supplies between early and late peas. As with other plants of the cabbage family, a high state of soil fertility will give best results. A suitable fertiliser which may be used for any and all of these crops can be made by mixing together 1 part sulphate of ammonia, 3 parts superphosphate, and ½ part potash—only muriate is available at present. The above quantities should be weighed, applied at the rate of ½lb. to each 9ft. of row, and well worked into the top soil before planting. If subsequent growth appears to be lagging, a pinch of nitrate of soda applied to each plant **after** a good watering will have a stimulating effect. This nitrogenous fertiliser can also be supplied in liquid form by dissolving a tablespoonful in 4 gallons of water. Good liquid manure may be used as a substitute for nitrate of soda, but should be applied oftener.

In the home garden, where all cultural work is carried out by hand, plants may, within reasonable limits, be set closer than is usual in commercial growing. Rows can be spaced 18in. apart and 14in. allowed between the plants. Planting distances for cauliflower, broccoli, and Brussels sprouts will vary from 24 to 30in. between the rows to 18 to 20in. between plants. Plants must not be set out in dry soil, and should be given a good watering after planting.

Where the early potatoes are ready the crop may be dug and the area occupied by them used for planting the autumn- and winter-maturing green crops. The potato tops should be burnt after harvesting and the ashes broadcast in dry condition after the soil has been turned over.

Tomatoes

Tomato plants should be kept closely tied to the stakes set for them if highest crop production is to be secured. Strong raffia is recommended as a tying material, as it has rarely been found to damage the stem which it encircles, whereas movement of the plant by wind is often responsible for stem bruise where the plant has been tied with a hard, unwieldy material. Bruising or damage to any part of the plant by this or other means should be carefully avoided, as it is very often through these wounds that injurious fungi and bacteria begin their work of destruction. It is advisable to fasten the tying material to the stake before putting it round the plant. This will prevent the raffia from slipping and will hold the plant upright, and if the tie is made under the junction of a leaf with the stem, additional support will be given to the plant when bearing its load of fruit.

Spraying tomato plants should not be put off "till tomorrow." During periods of high humidity the best protection the plants can have against attack by the fungus which causes late blight is a coating of Bordeaux mixture. It has been authoritatively stated that external manifestations of late blight do not become apparent until 10 days after the plant is diseased. When it is remembered that spraying with Bordeaux is not a remedy but a preventive, it will be seen how useless spraying will be if carried out **after** instead of **before** the disease is first seen on the plants. If incidence of late blight is not to prevent the development of a full crop of fruit, home gardeners should not neglect spraying. Failure to spray regularly and at appropriate times will almost inevitably result in the loss of a substantial part of the crop.

Leeks

To secure full development of leeks planting should not be delayed beyond December. The plant requires a rich soil, well supplied with organic matter, and this condition can best be brought about by digging in abundance of well-rotted stable or farmyard manure. Blood and bone manure, 1lb. to about 20ft. of row, worked into the top soil before planting will give good results, but a very much better product will be obtained if, in addition, the former recommendation is adopted. Rows may be spaced 12 to 15in. apart. The latter distance will permit more soil to be used from between the rows for blanching. When planting in 12in. rows a shallow trench about 4in. deep should first be made. By this means the plants will be set deeper, and less soil will be required when they are ready for blanching. Six to 8in. is the usual distance to allow between plants in the row.

Asparagus

Harvesting of asparagus spears should be completed early in December. Nothing is to be gained, and future production may be greatly impaired, if cutting is continued beyond then. When harvesting is finished the bed should be given a complete clean up and the fertiliser for the following season applied. This may consist of a good handful of blood and bone manure to each crown, together with plenty of wood ashes, and compost broadcast over the bed and worked into the soil. On light sandy soils half the quantity of blood and bone should be applied, the remainder being used later when the matured top growth has been cut and burned. Where the material is available, a heavy mulch of well-rotted stable or farmyard manure will be beneficial. This should be in addition to the blood and bone manure recommended previously.

Rhubarb (Spring)

The recommendations for asparagus may be taken as generally applicable to rhubarb. It should be specially emphasised that cultivation of the soil among both these crops should always be shallow. Deep cultivation is almost certain to destroy many of the feeding rootlets and seriously injure the main roots of the crowns.

Carrots

Home gardeners in the North Island who have carrots growing in a part of the garden in which the carrot rust-fly has previously attacked roots should watch for a change of colour in the foliage from a healthy green to a dark, bronze, autumnal shade. If and when this takes place, it can be taken as a sure indication that the rust-fly is present and damage of the crop is taking place. If the roots are well-grown, the better plan would be to dig them out and store them. If young and immature, powdered horticultural naphthalene may be applied along the rows at the rate of 1 to 1¼oz. to each 9ft. of row. To distribute this small quantity of naphthalene equally it can be mixed with dry sand or soil.

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Celery

As soon as they can be conveniently handled, celery seedlings from November-sown seed should be pricked out either into deep boxes or in the open ground. Quick growth is necessary at this time so that the plants may become well grown before being affected by adverse weather conditions. For the final planting a sheltered part of the garden should, if possible, be used. Soil preparation may be begun as soon as practicable. If some well-rotted stable or farmyard manure can be obtained, it should be dug in roughly and the soil left to be worked down just before setting out the plants. If this recommendation is adopted, many weeds which may have started to grow will be destroyed, thus saving subsequent hoeing.

Celeriac

Celeriac is not difficult to grow, and seedlings can be set out during December. These should be watered in when planting, and must not suffer from dry conditions, particularly in the early stages of development.

Beetroot

Any spare part of the garden can be used for growing a small patch of beetroot. Seed should not be broadcast; it is always better grown in rows. Any of the globe-shaped varieties will give heavier yields, although flat specimens may grow to consumable size in shorter time. Rows for this sowing may be spaced as close as 8 or 9in. apart and the plants thinned to 3 or 4in. in the row. The plant is not particularly exacting either in soil or fertiliser requirements, and a "catch" crop can usually be obtained without expense in any good garden soil. For a later and main crop fertiliser application is necessary. One part blood and bone manure and 2 parts superphosphate applied at the rate of 3oz. per sq. yd., together with as much wood ashes as can be spared, will supply the required plant food.

D.D.T.

In view of enquiries recently received concerning the possible use of D.D.T. in vegetable production, it is felt that some reference to it in these notes may be desirable.

D.D.T., the three letters by which the substance is known and is being sold, are the initial letters of the chemical terms dichloro-diphenyl-trichloroethane, of which it is composed.

D.D.T. is not, nor is it claimed to be, a fungicide; it is an insecticide, and, according to a recent statement by Dr. G. H. Cunningham, Director of the Plant Diseases Division, Department of Scientific and Industrial Research, "shows promise of becoming the most effectual general-purpose insecticide yet tested, being both a contact insecticide and a stomach poison. . . . The leaf population of aphides on carrots was reduced to approximately 2 per cent. with six applications of 1lb. to 100 gallons of water. Cabbages receiving five applications of the same dosage gave a yield of 90 per cent. free from white butterfly larval damage and about 98 per cent. were placed in first grade with hearts free from injury."

DON'TS

DON'T neglect to remove the tips of pumpkin and squash vines when they have grown to a length of 4ft. This will cause an increase in lateral growth and induce heavier cropping.

DON'T have separate days for spraying with Bordeaux mixture. Make up a sufficient quantity to spray all the crops in the garden which require this treatment, and apply it on the same day.

DON'T worry over what may be considered failures. This is one of the best ways by which experience is gained.

DON'T be satisfied with producing anything but the best. This is not too good for home consumption.

According to investigations which have been carried out overseas, D.D.T. may be poisonous to man if taken internally in any appreciable quantity, but no evidence is yet available as to the amount which may be consumed without having toxic results.

In the absence of reliable research information, it appears that the main objection to its use as an insecticide in vegetable growing is the possible danger of toxic residues remaining on the edible part of vegetables which have been treated with D.D.T. for insect control. Its general stability and low volatility seem to indicate this probable disadvantage.

It does seem necessary, therefore, to give a warning against its use as a vegetable insecticide until some guarantee can be given that no undesirable results are likely to accrue from its use.

—D. K. PRITCHARD, *Instructor in Vegetable Culture, Wellington.*

NOTES FOR BEEKEEPERS

Swarm Control and Replacement of Poor Queens

NOVEMBER is one of the most important and busiest months for beekeepers, and the ultimate degree of success in securing a honey crop will to a large extent depend on the effectiveness of the work done during this month.

Brood hatched at this time of the year in most localities will produce the bees necessary for the gathering of the main honey crop, and as the only way to secure the maximum surplus of honey is to have the greatest number of field bees in the hive when the main flow begins, every effort should be made to ensure that maximum brood rearing is maintained.

Condition of Hives

Particular care should also be taken to see that each colony is well provided with honey stores, as the quantities consumed at this period by brood and the increasing numbers of young bees is about to reach peak proportions. In most districts the danger of starvation during November is not great, early nectar sources being normally available, but if weather conditions prevent the secretion of nectar, or the bees from gathering it, the risk of colonies dying from this cause cannot be eliminated unless adequate provision has been made. If the apiary is in a district where clover is the only nectar source, and colonies are short of stores, feeding may be necessary right up to the commencement of the main honey flow.

Well-conditioned colonies will now be utilising two supers for the brood nest, and in order to provide ample room for the increased population of bees a third super should be placed above the brood. If a second super has not already been placed over the first brood chamber, this should be done as soon as the bees are covering from six to eight combs of brood. A good queen is capable of using from 14 to 16 combs for her egg-laying activities, and if these are denied her, the colony will be cramped for space and the bees are apt to swarm.

It is futile to persist with an endeavour to obtain a surplus yield from a colony which, for any reason, is below strength at the beginning of the main honey flow, as it is then too late for the bees to raise sufficient brood to be of any material use during the current season. Any colonies that have not reacted favourably to stimulative feeding, or to additional combs of hatching brood, should be united to other under-strength "queen right" colonies.

Swarm Control

The aim of commercial beekeepers is to keep down swarming, and as a rule this can be reduced to 1 or 2 per cent. by requeening the hives with a good strain of pure Italian queens at least every second year, and by providing the bees with plenty of room in which to expand in the late spring, and also sufficient ventilation during warm weather.

Advice was given in the October notes on how to check swarming, but although precautions may have been taken as indicated, swarming tendencies may persist to such an extent that removing queen cells every 10 days and distributing brood to weaker hives is no longer practicable. This persistence is more marked in some seasons than in others, although hybrids and black bees usually display greater swarming propensities than pure Italians.

Swarm control under such conditions is mainly a matter of comb and super manipulation. To requeen a hive of bees that has the impulse to swarm will not defeat their intention, and the queen (in this event) will also be lost when the swarm issues. Whether the necessary manipulations are applied after the colony has developed the "swarming fever," or to all colonies prior to the impulse, they are always based upon the principle of temporarily disturbing the continuity of daily emergence of bees in the brood nest.

Where the beekeeper considers that there are sufficient colonies in the apiary, and further increase is not desired, steps will be necessary to prevent swarming and the consequent loss of crop.

Several methods can be adopted which incorporate the principle of "temporary brood disturbance," and in each of these the brood nest is divided to a greater or smaller degree, according to the local conditions and circumstances in the colony.

One of the most effective methods adopted by commercial beekeepers when very strong colonies are raising swarm cells is a modification of the Demaree system. If this system is adopted, the hive should comprise not less than a double brood chamber, also a super above a queen excluder, with each storey fairly full of bees. The brood nest should contain about eight combs of brood in the top

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chamber and about four combs of brood at the bottom.

The method is carried out as follows: Remove all the supers above the bottom brood chamber, make certain that the bottom box has only three or four combs of brood, and destroy all queen cells started. Place the original (second box) top brood chamber back in position on the hive and remove the brood combs from this box singly, after shaking all the adhering bees (including the queen) down into the bottom box. When emptied, this box should be filled with good worker combs and a queen excluder placed on top. Next replace the original super of honey combs (over the excluder), and on top of all place the removed brood (after destroying all queen cells) in an extra super, thus making a four-storeyed hive.

In 10 days' time any queen cells raised in the top super above the queen excluder should be destroyed. This procedure places most of the young bees in the top portion of the hive, where they will not cause swarming, and below the queen excluder there is plenty of room for the queen to expand brood rearing. All the brood transferred above will be hatched in three weeks, and provision made for the subsequent storage of honey.

This method should not be attempted if there is a danger of very cold weather, or low night temperatures, otherwise there is a risk of the brood placed at the top of the hive being chilled.

Making Increase

When increase in the number of hives is desired the same procedure may be adopted, except that in this case all but one of the queen cells are destroyed at the visit in 10 days' time. The top brood chamber, together with the bees and remainder of emerging brood, is then removed and set on a new stand some distance away from the original location. If the move is made in the evening when all the bees are within the hive, fewer bees will return to the old stand. By this method a 100 per cent. increase is made and where young laying queens are available for introduction to the divided hive, there is less time lost than is the case when a ripe queen cell is utilised.

Replace Poor Queens

Systematic re-queening may be left until after the main honey flow, but if for any reason there are a few colonies which should be re-queened as soon as possible, the following simple method can be adopted:—First place a clean empty comb in the centre of a brood chamber that contains a good Italian queen and in two or three days' time she will have laid a number of eggs in the cells. When these eggs commence to hatch another strong colony should be prepared by removing its queen, together with all the combs containing eggs or uncapped brood. Then place in the centre of this colony the frame containing the young larvae from your breeder queen. A dozen or more cells may be started on this frame, but to make sure of a number of well-conditioned queen cells the hive will require feeding each day until the cells are capped on about the sixth day. On the ninth or tenth day each required cell should be placed into a nucleus hive so that the queen will be mated and laying before being introduced to a producing hive. One of the advantages in this method is that brood rearing is not curtailed for so long in the hive that is to be re-queened as is the case where the old queen is first killed and the queen cell then introduced. The delay in such instances can be as long as a week or 10 days.

Nuclei Hives

To prepare the nuclei it will be necessary to have sufficient supers that can be fitted with division boards, or alternatively small hives to accommodate three or four frames. On the tenth day (two days before the cells are ready to hatch) take from a strong colony one comb of sealed brood with the adhering bees, making certain that the queen is not on it. Place this comb in one of the nuclei hives with a frame of honey on one side, and a comb with some pollen, or two partly-filled combs, on the other side. Shake a few more young bees into it and gently attach a queen cell to the brood comb before moving the nucleus a few yards away on to a new stand away from the other hives. The operation is completed by packing green grass into the entrance of the nucleus to keep the bees enclosed for 24 to 48 hours.

When the new queens are mated, each nucleus colony may be transferred to a full-depth super, the empty spaces filled out with worker combs, and the whole introduced by the newspaper method to a honey-producing hive after the old or failing queen has been removed, or the young queens may be taken from the nuclei and introduced direct by the cage method.

Nuclei are so versatile in efficiently remedying colony requirements in the spring when used in the manner described that it is an advantage to maintain a number for immediate use as required until the main honey flow begins.

Nucleus colonies formed later for autumn queen-rearing purposes may subsequently be reduced by uniting, or may be carried over the winter months for increase or early spring use.

—*E. SMELLIE, Apiary Instructor, Christchurch.*

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POULTRY KEEPING

Management of Young Stock

INCUBATION will be completed at this period of the year, and poultry keepers should now devote adequate time to the care and management of their growing stock.

It should be the aim of all poultry keepers to keep their young stock growing steadily, and to achieve this regular feeding of good wholesome grains and meals with a supply of clean fresh water daily and an abundance of young succulent green food are essential. Oyster shell and stone grits should also be available to the birds at all times, and they need a good comfortable house with dry floors and free from draughts to sleep in.

Time to Develop

Pullets required as high-quality future breeding stock of good size at maturity must be allowed sufficient time to make the necessary body developments. The growth of young stock is governed by feeding and good management, and the person responsible should observe from time to time whether the birds are making too rapid growth or otherwise and plan the rations accordingly.

The fact that pullets often come to maturity very young suggests that the reproductive organs develop before full body maturity is attained. If this tendency is not controlled as far as possible, many of the birds become weedy and much below standard weight of the breed they represent. When pullets show signs of reaching sexual maturity too early all forcing foods, such as meatmeal, milk curds, etc., should be cut out of their rations.

A very important point in the management of growing stock is to keep the different ages and sexes separate, so that the feeding and treatment may harmonise with the stage of development of the different aged birds.

Many poultry keepers are inclined to underfeed their most forward pullets to check them from coming into lay too soon, or to overforce their younger birds in the hope of bringing them on. Such methods are a mistake, especially if carried too far. Experience has proved that steady growth gives the most satisfactory results, and that any deviation from natural development tends to reduce vitality, which in turn adversely affects production at a later date, and produces birds more subject to disease.

Benefit of Free Range

On no account should growing pullets be kept in confined quarters or under what might be termed hothouse conditions. The covered-in cosy house is ideal for laying pullets, especially where winter eggs are the objective, but for growing stock the value of free range cannot be overstressed. If young birds are to develop into vigorous and profitable stock, they should have all the conditions in their favour, and nothing is more helpful than clean ground to run on.

Of many different methods of rearing young stock the night-ark system has the advantage that night-arks may be moved on to fresh ground periodically, which is of great benefit to the young stock, particularly late-hatched birds.

Prospective breeding cockerels should be kept steadily growing and everything possible done to promote good health and constitutional vigour. As is the case with the growing pullets, a good range under natural conditions in conjunction with a non-forcing diet will encourage sound development.

Summary

1. Do not overcrowd growing stock. This is a dangerous practice and brings about lowered vitality.
2. Keep the different ages and sexes of stock in separate houses. Young stock will not develop into robust birds where birds of different ages are kept in the same house.
3. Cull out unthrifty and deformed birds. Whether cockerel or pullet they are only utilising space and food required by the good healthy stock.
4. Study the diet of growing birds and when necessary make changes according to their developments, giving the birds as much as they can eat without waste.
5. Feed an abundance of succulent green food to all classes of young stock.
6. Provide an ample supply of fresh, clean water to growing stock. Give young stock free access to oyster shell and gravel grits.

—H. A. KITTO, Poultry Instructor, Palmerston North.

Importation of Poultry into N.Z.

WITH the termination of the war there are indications of increased interest by poultry breeders in future breeding programmes, in considering which a breeder is most likely to weigh up the desirability or otherwise of introducing fresh blood into his poultry flock. For some, and particularly owners of flocks of the less popular breeds, this includes giving consideration to going overseas to obtain their requirements, since the choice of fresh blood within New Zealand is so strictly limited. Often such breeders have all drawn from the same source of supply originally, and having therefore the same strain of blood, interchange of stock does not constitute the introduction of fresh blood.

A number of enquiries have reached the Department of Agriculture recently seeking information on the importation into New Zealand of fresh stock from overseas, more particularly from Australia, and in view of this renewed interest a summary of the position as it affects poultry breeders follows.

Under a Customs Import Prohibition Order in 1935 live poultry (including fowls, ducks, geese, and turkeys) may

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not enter New Zealand from any country except with the permission of the Minister of Agriculture. This prohibition of imports of live poultry was instituted to afford the poultry industry adequate protection against the possibilities of introducing serious poultry diseases so far not recorded in New Zealand. Unfortunately there appeared to be no other means of affording this very necessary protection, and the Minister of Agriculture is most unlikely to make exceptions and grant permission for live birds to be brought into the country unless the circumstances are exceptional and the most stringent care can be taken to keep such stock under close observation for a considerable period after arrival.

The alternative to importing live birds is the bringing in of hatching eggs. This is permitted, providing the importer complies with certain conditions laid down in a Customs Prohibition Order gazetted in 1939. The intention of this Order is to protect breeders from importing hatching eggs carrying pullorum disease (bacillary white diarrhoea), or coming from stock unhealthy at the time of producing such eggs. Although pullorum disease is already existent in the Dominion, many flocks are now being blood tested annually, and it is hardly logical to risk re-infecting such flocks after considerable trouble has been taken to reduce outbreaks of this disease to a minimum. Thus the importer is requested to obtain a certificate with the purchased eggs stating that the flock from which these eggs have been taken is blood tested and all reactors removed, this test to have been carried out within three months of the despatch of the eggs. This is the only known practical method of effecting a safeguard against importing pullorum-infected eggs. The certificate, signed by a veterinary officer, also states that the flock in question was healthy at the time of the despatch of the eggs. It is particularly important to note that unless this certificate accompanies the eggs on arrival in New Zealand the Customs Department will not release the eggs for despatch to the purchaser. Would-be importers are also warned that they should obtain an import licence from the Comptroller of Customs before placing their order overseas.

The specific conditions governing the importation of hatching eggs are as follows:—

"The importation is prohibited (save with the consent of the Minister of Customs) of eggs of domestic fowls, ducks, geese, or turkeys, unless each consignment of such eggs is accompanied—

(a) By a declaration made not less than fourteen days prior to the date of shipment, signed by the occupier of the premises on which the eggs were produced, setting out the number, kind, and marking (if any) of such eggs, and the name and address of the consignee, and declaring—

(i) That the birds from which such eggs were obtained have been in his possession for a period of three months immediately preceding the date of the declaration.

(ii) That the birds are free from disease and that the disease known as bacillary white diarrhoea does not exist and has not during the last preceding three months existed on the premises on which such birds are kept; and

(b) By a certificate inscribed in the above-mentioned declaration signed by a veterinary officer in the employ of the Government of the country of export that after due inquiry and official inspection of the birds and premises referred to therein he has no reason to doubt the truth of the declaration.

"Every such declaration and certificate shall be produced at the port of landing to an Inspector under the Stock Act, 1908, who, upon being satisfied that the declaration and certificate are in order, and that they relate to the consignment of eggs intended to be introduced, shall issue a permit for the eggs to be landed.

"In regard to clause (a) (ii) a certificate from the New South Wales Department of Agriculture stating that the eggs are from isolated tested birds is deemed sufficient."

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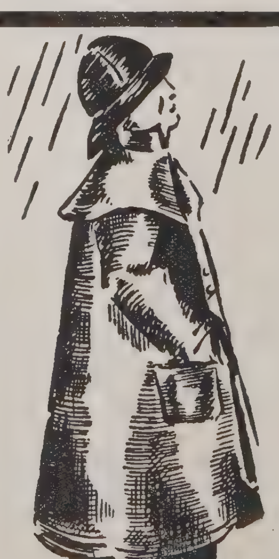

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YOUNG FARMERS' CLUBS

Planning Post-war Activities

To discuss post-war developments of the movement in the district a special meeting of the Western Bay of Plenty Young Farmers' Club District Committee was held at Tauranga recently, 28 delegates representing all clubs. In opening the meeting, Mr. A. J. Voss stated that with the end of the war the Y.F.C. movement could get back to its pre-war strength. At the outbreak of war there were nine clubs in the bay, and although at one time these had dwindled to five, the district was now back to its pre-war strength of nine active clubs. During the past few years the bay had played an important part in the activities of the movement throughout New Zealand, and had been one of the most actively functioning district committees. He stressed the value of the movement to the farming community, and particularly the part that the movement could play in assisting the rehabilitation of returned men on the land. He urged all clubs to make a drive through their district in a search for new members.

Ten Points

During discussion all of the following factors were stressed as important if the movement is to remain a vital organisation.

1. The strength of the movement lies in encouraging the younger members to take an active part in the organisation, and at club and district meetings they should be encouraged to take part in discussions and made to feel that their opinions are of value and are appreciated.

2. All Y.F.C. members should be familiar with the aims and objects of the movement, and should be active in furthering such aims.

3. Care should be taken to elect strong representatives to the District Committees, meetings of which should be held at regular intervals and all clubs represented.

4. Club meetings should be run in a businesslike fashion, and the rules relating to the correct conduct of a meeting should at all times be adhered to. In this connection it was stressed that the future leaders of the farming community will come to a large extent from the ranks of the Y.F.C. movement, and a knowledge of correct business procedure would be of advantage to all members in later life. A proper agenda paper prepared by the secretary should be adhered to, and all correspondence should be discussed. Finally, members should be loyal to their club officers and give them full co-operation. It was suggested that one method of increasing the efficiency of a club was to spread the work over as many members as possible, in preference to leaving it to the fixed club committee.

5. Inter-club competitions in debating, athletics, hay and silage, stock judging, stack building, and pasture and calf rearing competitions stimulated interest, and a further suggestion was inter-club boxing.

6. To encourage junior members it was felt that it would be of value to appoint a younger club member as vice-chairman to control at least three meetings a year.

7. It was felt that no club meeting should be purely a business meeting, but that meetings should be made attractive; suggestions were lectures, impromptu or prepared speeches, and talks by active club members; a gymnasium could be a valuable asset to a club, while table tennis, darts, etc., were also advocated.

8. It was considered that farm schools and educational weeks should be re-established as soon as possible.

9. It was decided to inaugurate a full publicity campaign in the bay through the Press. There is to be an article first on the aims of the movement, followed by a history of the movement in the bay, and then articles giving the history of each club in the district over the past few years. Finally, there is to be a competition for the best essay by an active club member on the subject "The Y.F.C. Movement as it Affects Me," the winning essay to be published.

10. Finally, it was considered that more club and district field days should be held, to bring members together and to study problems in the field rather than the lecture rooms.

At the conclusion of the meeting a small committee was elected to draw up a programme to cater for the needs of the district.

—A. V. ALLO, District
Secretary, Tauranga.

Field Days

Southern Hawke's Bay District

A large number of young farmers attended a field day at the Woodville racecourse at which four classes of stock were exhibited for judging, followed by demonstrations.

Mr. R. J. MacDonald, of Dannevirke, handled the Southdowns class, demonstrating on commercial and stud animals. He stressed the importance of breeding a type of ram capable of throwing a lamb with a carcass to suit overseas requirements.

Mr. J. E. Hewitt, Mangamaire, dealt with the Romney sheep as affecting the fat lamb industry of New Zealand. He stressed the necessity for farmers to be vigilant, as there was a danger of other countries encroaching on our markets. The animals exhibited were discussed and reasons for the judges' placing explained.

The dairy cows were judged and demonstrated on by Mr. T. Ranford, of Te Matai, who said the cows exhibited had been well chosen for such a competition. Fineness was one of the things first looked for in a Jersey cow; any form of grossness should be avoided. Fineness, however, should be distinguished from weakness.

Mr. L. L. Marsdon, of Feilding, was judge of the baconer pig class. In his demonstration the type of pig for present-day bacon requirements was described and many questions answered.

At a veterinary demonstration by Messrs. Swanney and Dalgleish, veterinarians to the Bush Veterinary Club, many specimens of abnormalities and diseases in various animals were displayed and commented upon, and methods of prevention and treatment of common diseases were discussed.

Tea was arranged in the Oddfellows' Hall, Woodville, after which trophies were presented.

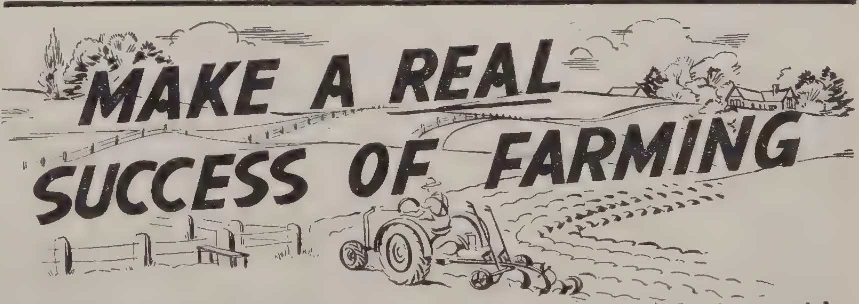
The winning team over all classes was the Dannevirke A team, who won the competition in which eight teams were entered. Returning the best card for the Southdowns was J. A. Hartridge, Dannevirke, who greatly impressed the judge of this class. Another Dannevirke club member, K. Hamilton, scored top points for the Romney sheep. In dairy cows J. Harris, of Mangatainoka, was the highest scorer, while G. V. Brown, of the same club, handed in the best card in the baconer pigs class.

Competition was keen and a notable feature of the day was the good scoring of students from the Dannevirke District High School, who are members of the Dannevirke Club.

Mr. J. L. Sunderland was congratulated on his being elected chairman of the Wellington Council of Young Farmers' Clubs. The meeting also paid a tribute to the late Sq. Leader E. W. Barnett, of Halcombe, a late Dominion president of the organisation.

Mr. E. P. Neilsen, of Palmerston North, lectured on "Stock Improvement by Breeding," illustrated by lantern slides and followed by an exhibition of live poultry illustrating further the principles of stock breeding as explained in the lecture.

—F. J. S. HOLDEN, District Y.F.C.
Secretary, Dannevirke.



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Opotiki Club

MEMBERS of the Opotiki Y.F.C. recently visited the properties of Messrs. Black and Vanstone.

Mr. Black's cowshed is an 8-cow well type of race shed, the first of its kind in the district. It does away with the need for milking stools, as the operators do everything in an erect position, the cows standing 2ft. 6in. above the milkers. Mr. Black claims to have put through 130 cows in 1¼ hours with the assistance of only one other operator. The drainage is underground. A striking feature of this unique shed is the complete absence of upright supports, leg-ropes, and bars or chains. The cows are packed in tightly and cannot kick the operators. Mr. Black explained his reasons for building and the advantage of his unorthodox cowshed and piggeries.

The piggeries are at present under construction. The whole lay-out is under one roof, and at present there are four sties complete with feeding troughs and sleeping quarters. Each pen will, at a later date, have its own grass run. Glass windows allow the sun to shine into every pen during at least one part of the day. Troughs are of the acid-resisting type, while the milk is gravitated by pipes from the milk tank up aloft. The floor and walls for 2ft. 6in. are of concrete, and the sleeping platform is of 2in. timber. The shed is ventilated through the roof and wall-vents which may be closed. There was a complete absence of the "piggy" smell that the majority of members expected; the warmth and freedom from any draught were noticeable, despite the strong wind outside.

Mrs. Black provided afternoon tea, and the club chairman, D. Bennett, thanked Mr. and Mrs. Black, and remarked that the visit and inspection would prove of great value to members.

The party then visited Mr. C. Vanstone's farm, where his son demonstrated a latest model milking machine.

—J. R. FISHER, Hon. Sec.,
Opotiki Y.F.C.

Co-op. Ownership Debated

IN a debate held at the R.N.Z.A.F. Station, Taieri, between teams representing the Taieri Air Force Y.F.C. and the West Taieri Club the subject was "That the co-operative ownership of the heavier and more expensive types of farm implements by two, three, or four neighbouring farmers (who can work co-operatively) would result in the better economic development of a great deal of the agricultural land in New Zealand."

The speakers were as follows: Taieri Air Force (affirmative): L.A.C. Clayton (leader), L.A.C. Scott, and L.A.C. Mills; West Taieri (negative); K. Reid (leader), L. Robertson, and W. A. Young. Mr. A. C. Cameron, Dunedin, acted as judge; the chairman was Mr. P. B. Gow (Dunedin District Y.F.C. Committee) and the time-keeper Mr. S. R. Whyte (hon. secretary, Otago-Southland Council).

The main points of the debate were as follows:—

Affirmative: The opening speaker stated that if the New Zealand farming industry were to survive, it had to have heavy farm machinery, which had been proved by Britain having to increase primary production during the war. Also New Zealand's climate, being like Britain's, meant we had to have the machinery to do the job quickly. There were therefore two alternatives, contract or co-operative ownership of heavy machinery.

The second speaker compared the contract system with the co-operative system, and contended that the latter had all the advantages without its disadvantages.

The third speaker used as an example the pooling of resources for war purposes, and also the success of the co-operative dairy factories.

Negative: The opening speaker stated that New Zealand's farming should be intensive, not extensive, and made comparisons with Denmark and Sweden. Without disparaging the ability of the New Zealand farmer to work in co-operation with his neighbour, he was of the opinion that the New Zealander was essentially an individualist.

The second speaker dealt with maintenance costs, which would be heavy because of lack of personal interest. Even if it was possible to obtain the services of a driver-mechanic, it would be difficult to provide full-time employment.

The third speaker stressed the difficulty of obtaining the machinery when required under the co-operative system, and said that farmers owning their own machinery could use it as and how they wanted to.

In congratulating the teams Mr. Cameron stated that they could, perhaps, have broadened the scope of their discussion. He awarded the debate to the Air Force team with 196 points as against 176 points to West Taieri. Most of the difference in points was accounted for by the outstanding presentation of his case by the leader of the affirmative, L.A.C. W. G. Clayton.

The teams were then entertained at supper in the airmen's mess.

—W. R. LOBB, District Y.F.C.
Secretary, Dunedin.

With Division in Rural Italy

Extracts from a letter written by C. B. ("Bill") Anderson, a member of the Bulls Y.F.C.

I am writing this letter from a little village situated on the foothills of the Apennines. Spring is well advanced now, and the grain crops are coming along nicely, while other patches of land are being ploughed. The pattern of strip farming, an unaccustomed sight to the Kiwi of a land where agriculture is carried on on a comparatively larger scale, is a common but striking feature of the landscape. The few olive and fruit trees scattered around the hillside lend a peculiar softness to the scene.

Pleasant Village

The village has about 4,000 inhabitants—to look at it you would say 500 to 1,000 was nearer the mark. It has an ancient municipal building showing the marks of more than one attempt at renovation, and the stone and brick houses and the cobbled streets are all old. The serenity of everyday life seems somewhat disturbed by the presence of a regiment of New Zealand artillerymen. Nothing out of the way occurs around here, but the brightness and the quietness accentuated by delightful weather have made our stay here a very pleasant one. The people are easy to get along with and are most responsive to fair treatment. They appreciate one's being able to speak their language, although the Kiwi's rendering may leave much to be desired. They love to be told that their country is beautiful—and it is—and they are always pleased to hear about New Zealand, about our people, and about our ways. Maybe it's the Kiwi's adaptability, but whatever it is, co-operation always seems to be the natural thing wherever we go.

Rehabilitation Service

At present I am with a detachment of the Educational Rehabilitation Service, which is operating with the Division, handling rehabilitation problems at this end and making a really good job. It is difficult to do many things in a practical way, but the correspondence school section runs a varied list of courses which have met with a remarkable response. There is no doubt that this organisation will have a great effect on post-war rehabilitation of the troops. Instead of returning with haphazard ideas of their future occupation, men will be coming back with their minds set on a particular job and with certain qualifications which will assist them in settling down in a very short time. This

Large-horned cattle in Italy.

What a "donk" can carry!

will apply, perhaps, to a greater degree to those who have been in the Army since they were 18 years of age, and whose careers were more or less nipped in the bud. Interest has been aroused in a great variety of trades and callings, and we have had requests to the library for books on fur cutting, watchmaking, and many other subjects of a somewhat unusual nature, which goes to show that the men are interested in their own post-war future.

Village Fair

The life of the village was brightened today. A fair was held. They are, I believe, quite regular affairs, but a day out of the ordinary for the country folk. All sorts of things change hands and every subject is discussed. Early in the day stall-holders arrived with an assortment of wares and set up stands in the square or along the main street. There's no haggling over prices—pay up or shut up! Money is good if you have plenty of it, but prices are very high. Half-inch elastic was roughly 4/- per yard; very poor shirts £3/5/-; kiddies' shoes £1/4/-. The scene, though, was very amusing: stall-holders with their blunt, non-committal faces gradually filling tattered satchels with bank notes as business proceeded; small boys dashing in and out of the crowd; a lady buying shoe polish, putting the contents to her nose, and sniffing heavily in a knowing way. She bought, but the product was very inferior! However, Easter is only a week away and all must look their best for the festival!

The gaiety of the day was somewhat dampened by a fall of rain at about 10 o'clock—not very much, but sufficient to make people seek shelter. Fortunately, the shower was of short duration and the return of pleasant weather brought about a continuation of the bargaining.

High-priced Stock

On the western side of the village was the market square, and here gathered the country folk with all the cattle, sheep, pigs, horses, and donkeys. Disposal of stock was by mutual agreement, and the effecting of a sale had to be seen to be appreciated. In one part of the square a lame donkey was being sold, the virtues and otherwise of the beast being voiced in an alarming manner. Gesticulations were even less assuring to the uninitiated spectator. Finally, the two concerned in the deal came to grips in a terrific handshake, their voices reaching a crescendo not previously attained. The bargain was finalised and the noise stopped by an uninterested third party, who brought his hand down and broke the clasped hands of the bargainers. The deal was through. Hard cash was paid over—£35 for a lame donkey.

The prices being paid left one a little astounded. Quite an ordinary bull sold for £1,250; dry cows fetched £250; 10-months-old heifers £50; pigs £25; rams £35; and quality generally left a lot to be desired. Incidentally, most of the cattle were white and most of the bulls had huge horns.

Sunday is the people's day in Italy. The very best of attire is worn and the village square is thronged with old and young, with a sense of gaiety and brightness over all.

Next Sunday our crowd has arranged a race meeting with four events for horses and two for donkeys. From what I can gather they have been popular events in other parts of the Division area, and no doubt we, too, shall have a good response.

I hope to go up to Venice and Trieste in a few days. We are taking libraries up to the Division, and although the trip will be a bit monotonous, it will be good at the other end.

◆

Reports on Club Activities

WESTERN SOUTHLAND

South Hillend.—Discussion on Memorial Scheme. Selection of applicant for Lincoln College Old Students' Scholarship. Request from Southland A. and P. Association for nominations of associate judges to act at the summer show. Y.F.C. Land Settlement Scheme discussed. Club debate, "Should Transport be State-owned?"; speakers, R. Paterson, R. Clearwater, M. Heenan (affirmative); J. M. Murphy, W. Kirkwood, S. Ballantyne (negative). Mr. C. S. Hardy acted as judge. Attendance of 20 members out of 24.

Wyndham.—Business discussion. Address by Mr. W. L. Stewart on "The Introduction of Livestock to New Zealand"; the speaker also exhibited two film-strips, one dealing with the manufacture and uses of penicillin and the other showing views of Canada. Nine members present out of 24.

EASTERN SOUTHLAND

Five Rivers.—Club debate—"That Rail Transport is better than Road." Mr. G. Hamilton acted as judge, and after a close contest, the supporters of road transport were awarded the decision. Twelve members present out of 19.

SOUTH OTAGO

Clinton.—Arrangements for members to inspect Mr. Mosley's stud rams. Veterinarian from Gore to speak at next meeting. Social evening held. Eleven members present out of 19.

Te Houka.—New club, recently formed; officers elected, advisory president, Mr. W. E. Moffat; chairman, A. W. Moffat; secretary, P. W. Moffat. Twelve members present at initial meeting. At subsequent meetings discussions were held on the Y.F.C. Memorial and the Land Settlement Schemes. At one meeting the advisory president, Mr. W. E. Moffat, gave a very descriptive talk on a recent tour of the North Island; the other meeting was addressed by Mr. Heyhurst, local veterinarian, who dealt with the following: Bearing troubles, sleepy sickness in ewes, and lambing. Attendance of 16 out of 19.

DUNEDIN

Dunback.—Films dealing with farming and soil erosion exhibited by the International Harvester Co., Messrs. Bevin (Christchurch) and Hoy (Dunedin) being in charge of the projection, etc. Over 80 people were present at the film and the dance which followed. This was a good effort on the part of a new club, and apparently gained them some finance and new members. Members of the Palmerston South Y.F.C. were present, and a debate has been arranged between the two clubs on "The Pooling of Farm Machinery."

NORTH OTAGO

Enfield.—Discussion on Y.F.C. Memorial Scheme. Address by Mr. O. Scherp on his experiences and farming in the Middle East. Attendance of 13 out of a total of 25.

Five Forks.—Secretary to write and thank all who had helped at the recent field day. Profit from field day and dance, £28 13s. 6d. Arrangements for field day at Messrs. McCaw Bros.' property, Hakataramea. Discussion on the Y.F.C. Memorial Scheme; also the Y.F.C. Land Settlement Scheme. Mr. I. Muldrew, a member of the club returned from overseas, gave an interesting address on "Farming in Italy," and answered numerous questions. There was an attendance of 16 members out of 27.

Herbert.—Discussions on the Y.F.C. Memorial, Land Settlement, and the Lincoln College Old Students' Scholarship. Mr. Ingram gave an interesting lecture on "The Care of Breeding Ewes, and Diseases connected with Lambing," after which the meeting was thrown open for discussion. Thirteen members present out of 16. At a later meeting arrangements were made for a dance, and talks were given as follows: A. Budge ("Shearing Machines"); P. Anderson ("Lubrication of Shearing Machines"); R. McMann ("Wastage in the Pig Industry"); W. Wilson ("Flystrike and Prevention"); W. Kroll ("Lucerne"); and P. Marshall ("Lucerne"). Fourteen members present out of 20. It is interesting to note the increase in this new club's membership; eleven at the initial meeting in August, now increased to 20.

SOUTH CANTERBURY

Geraldine.—Welcome to Charles Bennett, a club member, who has been a prisoner of war for over three years. The Hibbs Memorial

Debating Cup was won by K. Goodwin. Two club debates were held, the speakers being as follows: (1) C. Kelman, M. Hughes, M. Goodwin (affirmative); E. Worner, W. Nelson, J. Sheed (negative). (2) P. Tempel, I. Sheed, B. Padgett (affirmative); K. Goodwin, O. Neutze, W. Little (negative). Both debates were won by the negative. Attendance, 22 members out of 36.

Geraldine D.H.S.—General business. Address by Mr. J. H. Pennycook, Agricultural Instructor, Board of Education, on "How to Control a Meeting." Fourteen present out of 16.

MID-CANTERBURY

Hinds.—Arrangements for stock-judging contest to be held at Mr. J. H. Grigg's Estate, Longbeach. Lecture by Mr. R. Inch, Department of Agriculture, on "The Certification of Seeds." Attendance of eight out of 20.

Methven.—Report on the A. and P. meeting by C. J. Wilson. Discussion on district pasture judging competition. Mr. Garrett, of Lincoln College, gave an instructive lecture on "Land Valuation," and also spoke briefly on farming methods in New Zealand and countries overseas. There were 36 members present out of 84.

Wakanui.—Discussions on Y.F.C. Memorial Scheme, Land Settlement, and the Lincoln College Old Students' Scholarship. Lecture by Mr. R. Inch, Department of Agriculture, on "The Certification of Seeds." Attendance of 12 members out of 15. Several members of the Federated Farmers were present by invitation.

CHRISTCHURCH

Darfield.—Discussions on the Y.F.C. Memorial and Land Settlement Schemes. **Final arrangements made for annual dance. Discussion with Mr. H. J. Buttle, President of the Farmers' Union, relating to a debate to be held with the Farmers' Union at an early date.** Eighteen members present out of 35.

Ellesmere.—Discussion on Y.F.C. Memorial. Dr. M. M. Burns, of Lincoln College, gave an address on "Soil Survey," and exhibited a series of films showing various types of soils throughout the world. Twenty-six members present out of 56.

NORTH CANTERBURY

Amuri.—Members welcomed back from overseas, as follows: R. Bethell, I. K. Dunbar, A. G. T. Dunbar, T. H. Belton, M. D. Chick, A. T. Black, and R. M. Thomson. R. Bethell gave a very interesting address on the Middle East, dealing with types of farming east and west of Cairo. The speaker stated that to encourage farmers to grow wheat the British Government paid them the equivalent of £1 per bushel. During the whole of the time he was in the Middle East he saw only four tractors, practically all the work was done by men and women. On one occasion he saw men and women cutting a 150-acre crop; three days later he passed by again, and found all the crop cut. He mentioned the water buffalo was the commonest animal; it supplies the people with milk and it is used for hauling. There were 32 members present out of 46.

Cheviot.—Discussions on the Y.F.C. Memorial and Land Settlement Schemes, and the Lincoln College Old Students' Scholarship. Three debates held between speakers from Spotswood and Domett, the subjects being (1) "That Arable Farming is preferable to Pastoral Farming on the same type of Land"; (2) "That Military Training should be Compulsory after the War"; (3) "That Co-operative Farming is to the benefit of New Zealand." Twenty members present out of 29.

Hawarden-Waikari.—Final arrangements for annual ball. Films exhibited by the International Harvester Co. showing the asctivities of the Soil Conservation Department in America, and a trip through Central Africa. Twenty-four members attended out of 33.

Scargill-Omihi.—Discussion on the club's centennial memorial tree plot at Motunau. Full discussion on the Y.F.C. Memorial and Land Settlement Schemes. Mr. E. G. Smith, Department of Agriculture, and Mr. Spratt, of Dalgety and Co. Ltd.. spoke on "The Growing, Harvesting, and Marketing of Small Seeds." A good discussion followed and many questions were answered. Twenty-two members present out of 31.

NELSON

Dovedale.—General business. Address by Mr. S. Silcock on "The Raising of Cattle." At a previous meeting members took part in a series of impromptu speeches dealing with farming matters. An address was given by P. J. Burnett on "Farming in Italy." Only eight members were present out of 17.

Moutere.—Six new members enrolled. Discussion on Y.F.C. Memorial Scheme. Address by Mr. Dumbleton, of Cawthron Institute, on "Insect Pests and Bugs." Fourteen members present out of 21.

WESTLAND

Kokatahi-Koiterangi.—Newly formed club. Officers elected: Advisory President, Mr. M. Wallace; chairman, J. P. Ritchie; secretary and treasurer, J. L. Michell. There was an attendance of 13 at the initial meeting, and the club appears to have good prospects.

HOROWHENUA

Levin.—One new member enrolled. Y.F.C. Memorial discussed. P. Bartholomew appointed club reporter. Arrangements for a club debate. Discussions on the Y.F.C. Land Settlement Scheme and the Lincoln College Old Students' Scholarship. Talk by Mr. W. S. Penny on "The Maintenance of Farm Machinery." Seventeen members present out of 33.

MANAWATU

Apiti.—Arrangements for a shearing competition to be held in November. Address by Mr. K. Cowan on "Farming in England: Comparisons between 1940 and 1945." Attendance of 30 members out of 37.

Halcombe.—Discussions on Y.F.C. Memorial and Land Settlement Schemes. Talk on "Fencing" by Mr. Brewster. Sixteen present out of 18.

Rangiotu.—Business meeting. Dance to be held at a later date. Arrangements for lecturer at next meeting, and for a field day at Longburn Freezing Works. Eleven members present out of 15.

Rongotea.—Report on club's Victory Dance discussed. Ideas put forward for raising funds for the Y.F.C. Memorial. Reported that the club had scored another win in a football match against Kairanga. One new member enrolled. Lecturer for evening unable to attend, so general discussions took place. Twenty-six members present out of 46.

WANGANUI

Marton.—Five new members enrolled. Volumes selected by club library sub-committee announced. Lengthy discussion on Y.F.C. Memorial; suggestion put forward. Trial with sweet clover to be discussed at next meeting. Chairman appointed as delegate to Federated Farmers. Mr. N. V. Rix-Trott, of Huntly School, gave sound information and advice on impromptu speaking, after which names were drawn from one hat and subjects from another; the impromptu speeches were given as follows: J. W. Frederick ("Fencing"); E. C. Gower ("Prevention and Treatment of Footrot"); J. C. M. Shield ("Shearing"); M. M. Marshall ("Fencing"); A. L. Vile ("Pruning Fruit Trees"); M. F. Gray ("Water Supply"); A. H. Nitschke ("Construction of a Wool Shed"); H. R. Miller ("Ploughing"). Attendance of 24 out of 40.

Waimarino.—Discussion on Y.F.C. Memorial. Arrangements for a stock-judging competition; also for a visit to Mr. Ashmore's property to inspect improvement effected by worms. Talk by Mr. A. Ashmore on "Casting Worms." Twenty-one members present out of 34.

Wangaehu.—Newly-formed club. Secretary, G. P. Anderson. Further details will be published next month.

SOUTH TARANAKI

Alton.—Discussion on Y.F.C. Memorial Scheme. Talk by Mr. J. E. Davies, Department of Agriculture, on the Y.F.C. movement. Attendance of 12 members out of 17.

CENTRAL TARANAKI

Pukengahu.—Discussions regarding cricket team for the season, and the holding of a calf-judging competition in January. Talk by Mr. W. T. Brown, Department of Agriculture, on "Utilisation of Farm Manure." Attendance of 10 members.

Toko.—Report on recent club dance. Discussion on Y.F.C. Memorial. Three new members enrolled. Address by Mr. D. J. Steele, B.Sc., of Sydney Veterinary College, on "Ailments of Dairy Stock." Eighteen members present out of 23.

NORTH TARANAKI

Karawaka.—Recently revived. Officers elected: Advisory president, Mr. C. B. Lepper; chairman, D. Hall; secretary, L. V. Oliver; treasurer, F. Snowball. Attendance fo 10 members at the initial meeting.

Mangamahoe.—Business meeting. Discussions on the Y.F.C. Land Settlement Scheme and Lincoln College Old Students' Scholarship; also on the Y.F.C. Memorial. Ten members present out of 11.

Mangorei.—Newly-revived club. Officers elected: Advisory president, Mr. H. West; chairman, O. Balsom; secretary and treasurer, A. G. Johnston. Attendance of eight at the initial meeting; membership later increased to 10. At a later meeting the club programme was discussed, and delegates appointed to the district committee. The district secretary, Mr. A. C. Burgess attended the meeting and discussed with members the Y.F.C. Memorial and Land Settlement Schemes. Six members present.

Omata.—Club recently revived. Officers elected: Advisory president, Mr. J. H. Thomas; chairman, A. Kurth; secretary and treasurer, F. Jordan. Ten members present at initial meeting.

Tikorangi.—Recently resumed activities. Officers elected: Advisory president, Mr. P. J. Sarten; chairman, V. Sarten; secretary and treasurer, E. Soffe. Nine present at initial meeting; membership later increased to 11. At a later meeting a discussion was held on the club's programme; an interesting letter was read by V. Sarten, being a letter of introduction from the Jewish refugees in Zion to the N.Z. Expeditionary Force. Nine members attended.

WAIRARAPA

Carterton.—Dance to be held in Parkvale Hall. Club debate, subject "That New Zealand should concentrate on her Primary Industries rather than on her Secondary Industries." Speakers: Seniors (negative), V. Meek, R. McKenzie, A. Fisher; juniors (affirmative); D. Bassett, F. Playle, J. Jones. Mr. B. Brassel acted as judge, and awarded the decision to the senior team. Nineteen members present out of 35.

Masterton.—Discussions on Y.F.C. Memorial and Lincoln College Old Students' Scholarship. Club to procure a Y.F.C. banner. Arrangements for club's annual birthday party. Smoke concert to be held at a later date as an official welcome to all returned members. An interesting address was given by Mr. Colin Welch, an ex-prisoner of war, entitled "Life in Italy"; the speaker, during his talk, dealt with the low standard of living and crude farming methods in the parts of Italy that he had passed through. He concluded his address with an account of his adventures after escaping from a P.O.W. camp. Thirty-one members present out of total of 73.

SOUTHERN HAWKE'S BAY

Ballance.—Business meeting. Discussions on the Y.F.C. Memorial and Land Settlement Schemes, and the Lincoln College Old Students' Scholarship. Thirteen present out of 23.

Woodville.—Discussion on Y.F.C. Memorial Scheme. Arrangements for annual ball. Lecture by Mr. J. Swanney, veterinarian, on "Milk Fever, and Seasonal Diseases of Sheep and Cattle." Attendance of 12 out of 25.

CENTRAL HAWKE'S BAY

Waipukurau.—Recently resumed activities. Officers elected: Advisory president, Mr. J. W. Harding; chairman, J. Mackie; secretary and treasurer, A. H. Wilson. Fourteen present at the initial meeting.

NORTHERN HAWKE'S BAY

Meeanee.—General business. Address by Mr. L. L. Griffiths on "Identical Twin Calves, and Paralysis in Cows." Poor attendance of 6 members out of 22.

POVERTY BAY

Gisborne.—This club recently resumed activities with an attendance of 56 at the initial meeting, all present becoming members. Officers elected: Advisory president, Mr. S. V. Smith; chairman, K. W. Cooper; secretary, R. J. W. Muir; treasurer, B. H. Drummond. At a subsequent meeting, attended by 31 members, motions of condolence were passed with parents of seven members who had made the supreme sacrifice. Addresses on the aims and objects of the Y.F.C. and the general activities of the movement were given by Messrs. C. H. Cooper (president, Farmers' Union), G. V. Smith (advisory president), and V. P. Boot (district Y.F.C. secretary).

TE KUITI

Otorohanga. — Arrangements for birthday dance. Field day to be held at Ruakura Animal Research Station. Address by Mr. R. Davies on "Auctioneering"; the speaker dealt comprehensively with rules at sale yards between buyer and seller, method of bidding, disputes, etc. There were 11 members present out of 27. At the previous meeting the subject of "Farm Dogs" was selected for the club's radio talk from 1YA, Auckland, and an address was given by Mr. J. F. Trapski, a local solicitor, on "The Land Sales Act." Seventeen members present.

Te Anga Central.—Discussion on future programme. Talk by Mr. K. M. Montgomery, Department of Agriculture, on "Spring Crops and Grasses." Ten members present out of 18.

TAUMARUNUI

Ohura.—Recently revived. Only six members attended the initial meeting, but it is anticipated that more will enroll in the near future. The club secretary is N. J. Dougherty.

Taumarunui.—Discussion on Lincoln College Old Students' Scholarship. Lecture on "Stock Diseases" by Mr. F. Price, Inspector of Stock. Good attendance of 20 members out of 21.

WAIKATO

Cambridge.—Decided that at each future meeting all members present to give briefly some handy farm hint. Address by Mr. R. Wottom, a local Jersey breeder, on "Stock Judging, and the Purpose of the Calf Club." Attendance of 18 out of 41.

Hamilton Technical College.—Commenced among the rural boys with a membership of 62. Mr. T. Rodda spoke on "Shade and Shelter on the Farm"; Mr. D. Lorimer on ""Beekeeping" and Mr. E. King on "The Breeding of Pedigree Dairy Stock." When outside lecturers could not be obtained some of the members gave talks, while at other meetings debates were keenly contested. We wish the club and its members every success.

Ngarua.—New club, recently formed with an initial membership of 27. Officers elected: Advisory president, Mr. P. W. Davis; chairman, C. Marx; secretary, T. A. Haywood; treasurer, T. A. Robertson. At a subsequent meeting delegates were appointed to the district committee, and arrangements were made for a dance. An address was given by Mr. A. Haywood, of N.Z. Co-op. Dairy Co., Ltd., entitled "An Impression of Australia." Thirty-two members present out of 34.

Okoroire.—Two new members enrolled. Discussion regarding dance. Lecture by Mr. Dewes, veterinarian, on matters of general veterinary interest; many questions were asked of the speaker. Attendance of 26 members out of 47.

Te Awamutu.—Arrangements for annual dance. Field day to be held on Mr. Krippner's farm, Te Rore. Addresses on "Power Alcohol Distillation" by Messrs. Kemp and Roscruge. Twenty-eight present out of 49.

Te Pahu.—Discussion on Lincoln College Old Students' Scholarship; the district secretary, Mr. J. R. Murray, gave some valuable information on the scholarship, and made suggestions for future club activities. Address by Mr. W. Whittleston, of the Ruakura Animal Research Station, entitled "Interesting Facts about Milking Machines." Attendance of 11 members out of 24; there were 12 older farmers present by invitation.

WESTERN BAY OF PLENTY

Kati Kati.—Mr. N. Batkin elected vice-chairman of the club. Decided to compile a short history of the club since its formation eight years ago. One application to be sent in for the Lincoln College Old Students' Scholarship. One new member enrolled. A motion was carried "That each member endeavour to bring a new member at the next meeting." Attendance of 12 members out of 26.

Paengaroa.—Report on recent dance held to raise funds for the Y.F.C. Memorial; profit of £27 8s. 2d. Team selected as follows to represent the club in the Gulliver Cup Stock-judging Competition: H. Walter, W. Marshall, and D. Ross. A special committee set up to deal with the suggested club memorial tree-planting scheme. Mr. A. V. Allo, Department of Agriculture, gave a very instructive address on "Commercial Fertilisers," followed by lantern slides illustrating the grass plot trials, etc., carried out by the department. Attendance of 30 out of 69. At previously unreported meetings a discussion was held on ways and means of increasing enthusiasm in the Y.F.C. movement, and an impromptu debate was held on the subject "That Co-operative Ownership of Heavy Farm Machinery gp groups of Farmers, Dairy Companies or County Councils, would be a better plan than Individual Ownership." There were attendances of 20 and 25 members respectively at these two meetings.

Tauranga.—One new member enrolled. Arrangements for a dance. Suggestion forwarded ed district committee that, at each meeting, members should stand for a moment in silence as a mark of respect to the memory of those who had fallen in the war. The name of one club member, killed on active service, was handed in. Lectures by Messrs. Camber and Strugnell on "Dairy Cows" and "Pigs" respectively. Fifteen members present out of 35.

Te Puke.—Arrangements for stock-judging competition to be held on Mr. L. Ashe's property, Te Matai Road. Talk on "Butter-making" by Mr. McCarthy, factory manager, Te Puke. Twenty-one present out of total of 31.

EASTERN BAY OF PLENTY

Opotiki.—Stock-judging field day to be held on Mr. J. G. Murray's property. H. Bennett reported on the recent district committee meeting held at Whakatane. Lecture by Mr. Burgess, Inspector of Stock, on "The Organisation of the Department of Agriculture." Club debate "That the Films distributed at present are not in the best National Interest." Messrs. F. K. Grant and D. Sherson acted as judges, and gave some constructive criticism which was greatly appreciated. Attendance of 19 members out of 28.

Thornton. — Newly-formed club. Officers elected: Advisory president, Mr. A. Hutton Adams; chairman, T. Mexted; secretary, J. Law; treasurer, J. Adams. Twenty-one present at the initial meeting. At a later meeting the membership was increased to 31.

Waimana.—General business. Appointment of delegates to committee to discuss a suitable Y.F.C. Memorial. Lantern lecture by Mr. E. R. Marryatt, Department of Agriculture, on "Feed Flavours in Cream and Butter." Small attendance of nine out of 20.

Whakatane D.H.S.—Discussion on Y.F.C. Memorial. Messrs. I. Hubbard (advisory president) and R. Law gave addresses on ways and means of raising funds for the memorial. Attendance of 20 out of 25.

AUCKLAND

East Tamaki.—Three new members enrolled. Arrangements for future meetings. Mr. Powell, of the International Harvester Co., exhibited some instructive films showing tractors working the soil and preparing it for sowing. Attendance of 27 out of 41. A field day was held on Mr. C. Litten's property, Howick. A practical demonstration of mole-draining was given by Mr. Litten; members were shown the method of crossing the drains with the mole-plough, and inspected drains which had been in operation for some time. Twelve members attended the field day.

Franklin.—The chairman, R. W. Legg, reported on the recent meeting of the Auckland Council. Arrangements for a concert to be held in Papakura to raise funds for the Y.F.C. Memorial. Messrs. A. Best and G. C. W. Howie appointed trustees for the clubrooms fund, and Mr. T. F. Gaskell as treasurer. A committee was set up, consisting of the advisory president (Mr. R. W. Franke), the chairman (R. W. Legg), and the secretary (C. C. Upton) with power to act in connection with the raising of funds for the clubrooms. It was decided to admit to free membership any ex-servicemen returning to the district, and to pay their "Journal" subscriptions out of club funds. Address by Mr. T. Totty on "Economics"; the speaker answered numerous questions. Twenty-two members present out of 36.

Harrisville.—Final arrangements for field day at Messrs. Sanford Bros. property, dealing with dairy stock. Decided to ask Mr. R. A. Lewis to act as judge and demonstrator. Three new members enrolled. Lecture by Mr. Clayton, of Tuakau, on "Bee Keeping." Attendance of 11 out of 20.

Howick D.H.S.—Newly-formed club. Officers elected: Advisory president, Mr. J. E. Maxwell; chairman, W. Hattaway; secretary and treasurer, M. Wenzlick. Ten present at the initial meeting. It is understood that the close proximity of the East Tamaki club and the opportunities for combined activities should maintain interest and ensure the success of this club.

Pukekawa.—Two field days to be held shortly. Club debate "That the Young Man starting Farming should take up Undeveloped Land in Preference to Developed Land." Speakers: S. Brewster, K. McNiel, R. Martin (affirmative); D. Orr, N. Murray, S. Logan (negative). Mr. McIntyre kindly acted as judge and gave some very useful criticism. Fourteen present out of 25. At the previous meeting four new members were enrolled, and 10 visitors were present from Glen Murray, where they are considering forming a new club. Address by Mr. R. Ramsay on "The Origin of Land Tenures." Attendance of 18 members.

Pukekohe East.—Arrangements for field day. Exhibition of Sparrow film-strips on Calf-feeding and Scenes of New Zealand. Thirty-two members present out of 42. The field day was held at Alton Lodge, Te Kauwhata; Mr. J. Fletcher demonstration on stud, racing, and breeding horses, and Mr. R. Weir on Ayrshire dairy cattle. Twenty-two members attended.

Bushel Weights in Common Use

			No. bushels per sack.
Barley ..	**50lb.**	**reckoned to the bushel**	**4**
Beans ..	**65lb.**	**" " " "**	**3**
Bran or Pollard	**20lb.**	**" " " "**	**7 to 10**
Maize ..	**56lb.**	**" " " "**	**3½**
Oats ..	**40lb.**	**" " " "**	**4**
Peas ..	**60lb.**	**" " " "**	**3½**
Ryecorn	**54lb.**	**" " " "**	**3½**
Wheat	**60lb.**	**" " " "**	**3**
Ryegrass	**20lb.**	**" " " "**	**6**

When any of the above grains are ground to a feed meal the bulk is thereby greatly increased and the reckoned bushel weight considerably decreased.

Colour

Be thou the rainbow to the storms of life,
The evening beam that smiles the clouds away,
And tints tomorrow with prophetic ray!—Byron.

THIS afternoon I spent nearly half an hour looking at the most perfect rainbow I have ever seen. Usually a rainbow forms an arch linking the far line of hills with the range on this side, but this one extended lengthwise down the valley, deepening the green of trees and hills, turning the mists above the highest ridge to sunset colours, and very appropriately having its foot in a golden wealth of gorse beside a singing, silver river. There was a light rain falling, but presently it stopped and the sun came out and the rainbow shone more brilliantly than ever. While I watched the colours dimmed a little once or twice. It was only momentary, however, and the bright-hued arc remained to delight my eyes for quite a long period before it finally disappeared from sight. Even after it had faded the topmost peaks were wreathed in purple shadows and the ribbon of sky just above them was the soft, clear colour of turquoise.

Surely there's never been a thing
Lovelier than a rainbow's wing
Trembling about the dark heart of a tree
That holds it in stilled ecstasy—
An arch whose mists of iris change
Gnarled boughs to something rich and strange,
And perfectly divide a sky
Where clouds like bent grey sheep go by . . . .
There's such serenity in a bow
Where soft fires windlessly and beautifully go
About the sky's bleak boughs of grey,
Strewing frail opalescent blossom on its way.
It holds tranquillity itself in thrall
In silences past reach of all bird call,
And spins a very heaven about a tree
Whose dark heart holds it in grave ecstasy,
Knowing there is no lovelier thing
In earth or heaven than a rainbow's wing.

How fortunate we are to live in a country where Nature has been so prodigal in her use of colours. We not only enjoy the beauty of the flowers and decorative shrubs belonging to the Old World, but we have the lovely offerings of our own native flora in addition—scarlet blaze of rata and pohutukawa's crimson splendour; golden kowhai and giant mountain buttercups; ruby-stemmed wineberry; poroporo's star-shaped blossoms of royal purple; glossy orange fruits of karaka and coprosma; ramarama's coral berries; red-gold racemes of rewarewa and flax, holding honey for the birds; bronze-leaved birch and bracken; red crescents of kaka beak; lavender-tasselled koromiko; mauve and magenta-frilled fuchsia freighted with blue pollen.

Then there is the countryside itself with all its delicate graduations of green, its tawny hills and great mountains glistening with snow. Among the cloud armadas overhead "the subtle spies of colour creep,

Changing that high austerity to delight
Till ev'n the leaden interfolds are bright,
And . . . . faint, far azure peers." *New Zealand's seascapes are so vivid that the deep blues and greens seem almost as if they had been enamelled.*

One of the chief reasons why the opal is my favourite stone is because of its colouring. Similar exquisite tints are found in pawa shells; soap bubbles when the sun shines on them; the wings of butterflies of the lycaenid species; oil spilt on a wet pavement; the plumage of pigeons—

When pigeons flock down in the drab city street
People beholding the flash of their wings
Are stirred to a vision of beautiful things:
Amethyst misting of dim, twilit hills;
Delicate jade of young leaves in the spring;
The fierce sapphire brilliance of still, summer skies;
Glimmer of pearl like the moon-silvered grey
Of far, lonely sands or a mesh of rain-spray.

Colour can be gay or wistful; restful or romantic; dashing or defiant. It can be expressive of mood or personality, according to the use we make of it in our attire, our possessions, and our homes. Truly, as Ruskin says, "Of all God's gifts to the sight of man, colour is the holiest, the most divine, the most solemn. . . . The purest and most thoughtful minds are those which love colour the most."

Mary

If it's Iris—it's irresistible

Fashioned with care from lovely locknit, with the subtle cut that gives you that trimly tailored-to-fit look. Colours and styles to indulge your feminine love for loveliness, quality to win your sense of value and values that make it easy to buy such quality.

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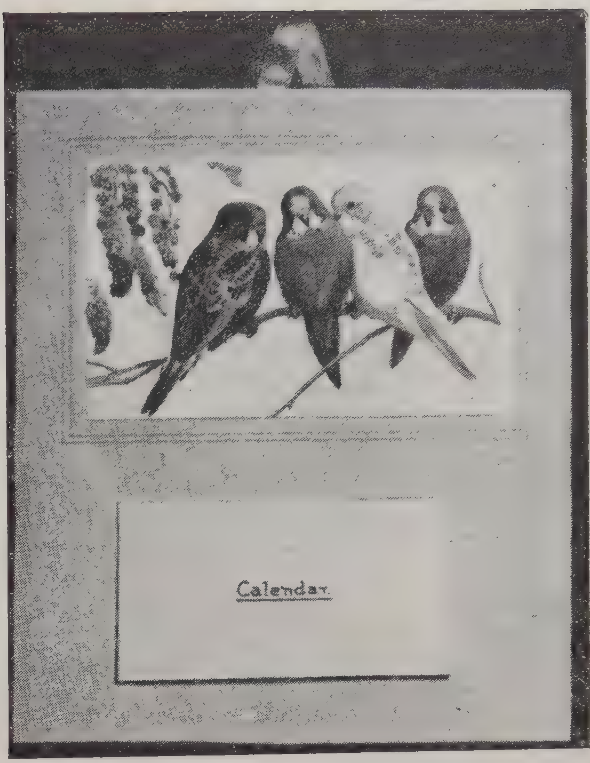
Home-made Gifts This Christmas

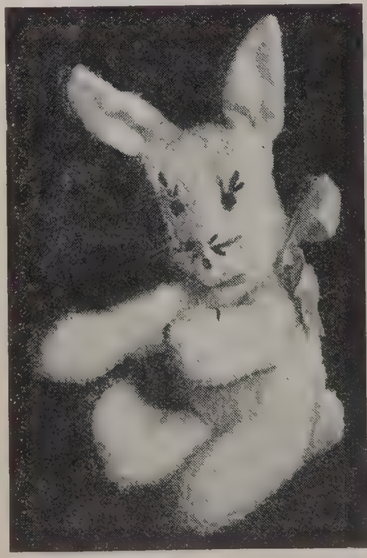


THOUGH the fighting is over, many wartime shortages still persist, and the shops are not heavily stocked with any great variety of goods. That need not discourage you from giving presents at this, our first Christmas of peace for so long, writes Eva Topping, Rural Sociologist, Department of Agriculture, Auckland. There are many things that can be made at home and are a pleasure to give and to receive. Small gifts for filling Christmas stockings can be made of materials already in the house; pieces of cardboard, dressmaking scraps, tins, matchboxes, clothes pegs, odd beads and cut-out illustrations can all be pressed into service. Matchboxes covered with bits of wallpaper or coloured pages from old magazines will make building blocks, toy trains, carts, and dolls' house furniture. Small tins containing one or two pebbles, then wrapped in rag and covered in bright wool crochet, make lovely rattling balls for the tiny folk to roll on the floor. Soft, cuddly stuffed animals and dolls made from wool, felt, or material are always favourites. For older children, "almost grown-ups," and adults there are endless possibilities. Here are one or two suggestions which may serve as a starting point for your own present-making activities.

Dolls' House Armchairs

An illustration of a comfortable-looking chair and an outline for making it are printed on the next page. Cut round the two shapes and use as a pattern to cut once in cardboard and twice, leaving turnings, in material. Crease the cardboard along the dotted lines. The chair in the picture was made from scraps of blue corduroy velvet, but almost any kind of material could be used if the design is not too big. Take up the cardboard shape, place it on the outside covering material, and tack in place. Make long stitches from side to side or roughly oversew to keep it steady. Take up the inner covering, turn in at lower edge, and oversew to outer cover. Stitch up the fronts, over the arms, and half-way round the back; at this point tuck in some padding to give a well-upholstered look to the back. Clippings of cloth, ravelled wool, or scraps of cotton wool will do. Poke the stuffing around with the end of the scissors to make it set in the right way. Finish sewing on the cover.

Do the other section in the same way, giving it a nicely-padded seat. Attach by stitching to the back and up the front corner edges. A settee could be constructed from the same pattern by widening the back and seat measurements, making them about two and a half times the width of chair. Small cushions made from pretty scraps would add to the attractiveness of the gift and call forth cries of joy from any little girl who is busy furnishing her dolls' house.



The stuffed rabbit (pattern on page 545).

Toy for a Toddler

Toy animals made from towelling and stuffed with clean white rag clippings make splendid presents for the babies of your family circle. They have one big point in their favour; they can be washed—even boiled if need be—but the drying will be a long process and requires plenty of sun and a strong current of air.

For the rabbit less than half a yard of white towelling is needed; in fact this amount will leave you sufficient material for one face washer, which can be crocheted around the edge in colour and will make another gift.

For the lining of the ears and for the tongue use pale pink material; a tiny piece of winceyette, silk, or cotton will do. Make all the seams about $\frac{3}{8}$in. in from the raw edge, stitch by machine, or, if working by hand, use backstitch to make a firm seam. Stitch round the body, leaving the top edge open, turn, and stuff with small clipped pieces of white rag.

Stuff fairly firmly, poking into the corners with the blunt end of a pencil or wooden skewer, to within ⅜in. of open edge. Sew round the legs and "arms" in the same way, turn, and stuff. Fold over ⅜in. of open end and attach to the body at the positions marked by dotted lines on the pattern. Make the tail and attach in the same way. Stitch round the tongue, turn. Embroider the markings on the face—pink nose, black whiskers, and brown for the eyes. Stitch round the head, leaving the opening between the two points marked "X." Turn and stuff and stitch to the neck. Insert the tongue below the nose, and tip the head slightly forward and to one side. Stitch the ears and ear linings, turn, fold in raw edges, and attach to the head at the mark on the back. Tie a bow of ribbon or strip of soft material tightly round the neck and secure firmly with a few stitches.

Sponge Bags

Attractive and useful sponge bags can be made very quickly. Use any bright material; striped linen or silk and floral or formal-patterned cottons are very suitable. Some kind of waterproof material is needed for the lining; oiled silk, jaconette, American cloth, or the new kind of material used for waterproof coats and hoods and sold by the yard in various colours will be excellent for the purpose. A quarter of a yard will line two bags.

Sponge bag.

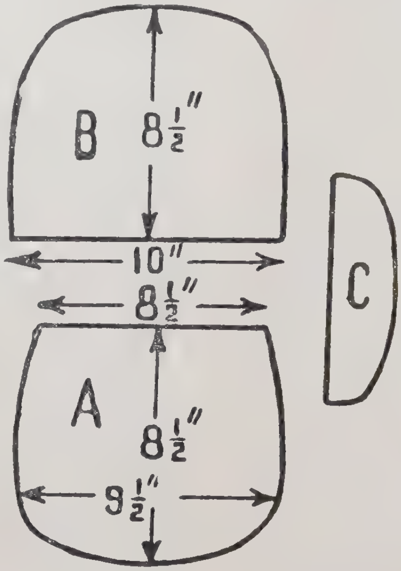


Diagram for making striped sponge bag.

For the striped bag odd pieces of dress linen were used. Cut one piece of covering material and one of lining in each of the three shapes shown in the diagram. Take up the flap and bind along the curved edge with crossway strips in a matching colour. Put two small pleats in the front part to make it the same width as the back and bind the top edges. Place the right sides of flap and back together, stitch, and bind. Turn the flap to right side, place front in position, and bind back and front together. Stitch a folded strip of material to make a handle ¾in. wide, about 9½in. long, and attach to the top of bag.

The patterned bag is more quickly made. Cut one piece of material and waterproof lining 18in. x 10in.; join the short sides and then, with right sides together, stitch along the top edge, turn, and run two more rows of stitching ½in. apart and about 1in. from top fold, to make the heading and a casing for the draw strings. Cut a circle of material and lining (the top of a tea cup or baking powder tin will make a good guide) leaving turning of ⅜in. Gather the bottom of the bag through both lining and cover and sew to the edge of the circle. Put the base lining in place and stitch down over the raw edges. Cut two slits in the outer cover between the top rows of stitching, one at the seam and the other opposite to insert the draw strings. Finish off

Attractive striped sponge bag.

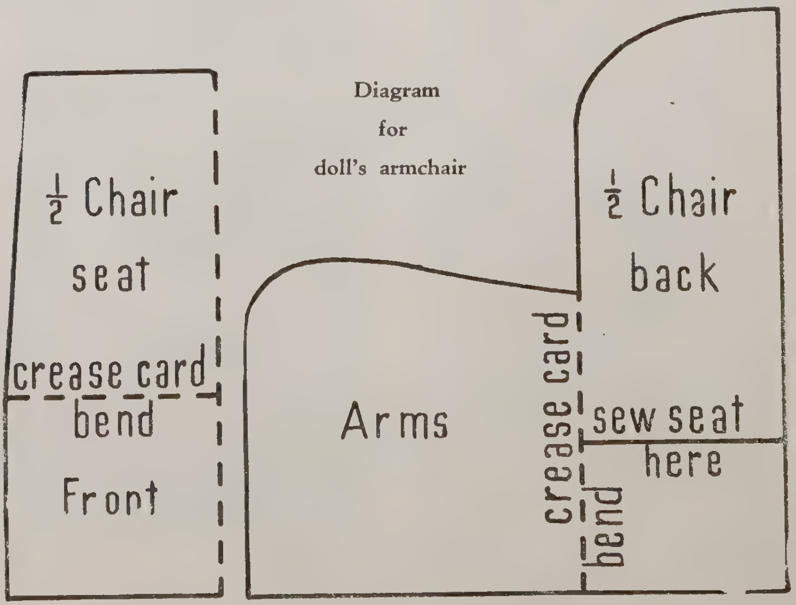


Diagram for doll's armchair

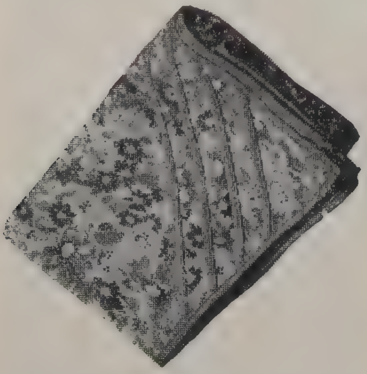
the slits with buttonhole stitch to prevent tearing. One yard of cord or braid will make the two strings.

Tray Cloth Sets; Tea Cloths

Have you an invalid friend or a small girl in bed with a cold? She would be charmed by the pretty gift set of tray cloth and napkin. Short lengths of printed cotton bought from the remnant table will be just right, or there may be a large enough piece left over from a summer dressmaking venture. The cloth should measure about 21in. x 14in. and the napkin 12in. or 13in. square. Hem the edges of the cloth, hemstitch, or finish with bias binding. The napkin needs only a tiny hem, stitched by hand, as binding would be a little too thick and heavy on the smaller size. Choose colourings which will tone with the bedroom furnishings or with the china generally used on the tray.

Tray cloth and napkins.

Larger pieces of material, about a yard or even a little longer, will make very gay cloths for sunporch or kitchen table at morning tea time. They can be of bright, bold floral patterns, check or spot designs, but stripes do not look so well. A busy woman will appreciate them as they are so easily washed and ironed, while owners of plain white china will like them for the colour and interest they add to the table. Finish the edges with binding, plain hems, or rick-rack braid.

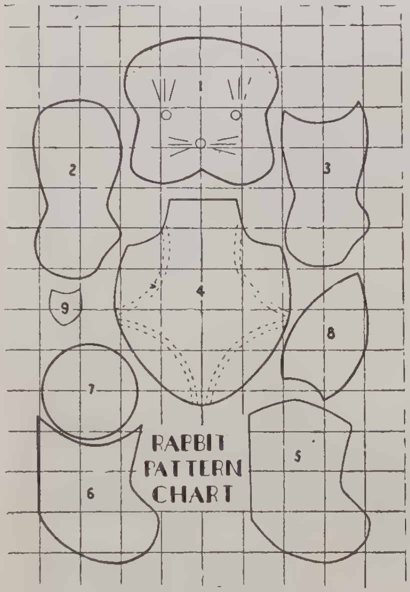


Floral design tea cloth.

Rabbit Pattern Chart

To make the pattern draw squares on a large piece of paper. For an animal the size of the original (about 8in. high) 1in. squares should be used, but if desired a smaller or larger size may be made.

Then, using the small chart as a guide, draw in the outlines of the various parts. The best way is to mark where the outlines cross the squares, and then join these points with smooth curves. Only half the head, body, ear, and tail need be drawn, as the pattern piece is placed along a fold when cutting out the material.



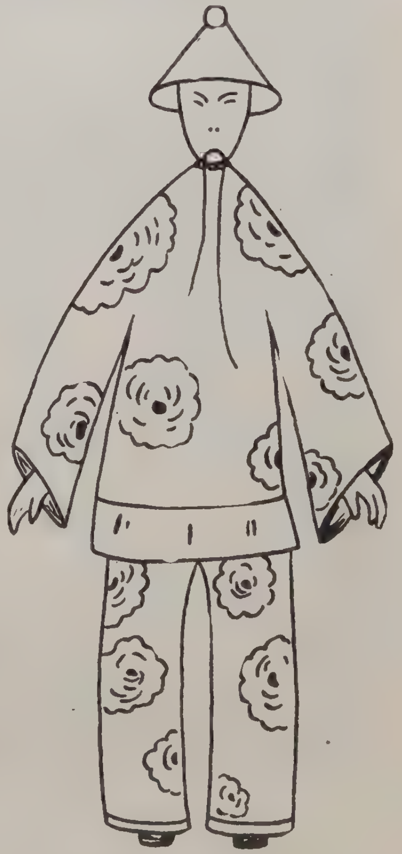
When the outlines have been drawn cut out the shapes and use as follows:—

1. Head, cut two pieces.
2. Back of arm, cut two pieces.
3. Front of arm, " " "
4. Body, " " "
5. Back of leg, " " "
6. Front of leg, " " "
7. Tail, " " "
8. Ear, cut two white pieces, two pink pieces.
9. Tongue, cut two pink pieces.

The dotted lines on the *body* pattern show where the legs and arms are to be sewn on, the backs along the longer and the fronts along the shorter lines. The dotted lines on the *head* show where the ears are to be sewn, *at the back.*

Bookmarks

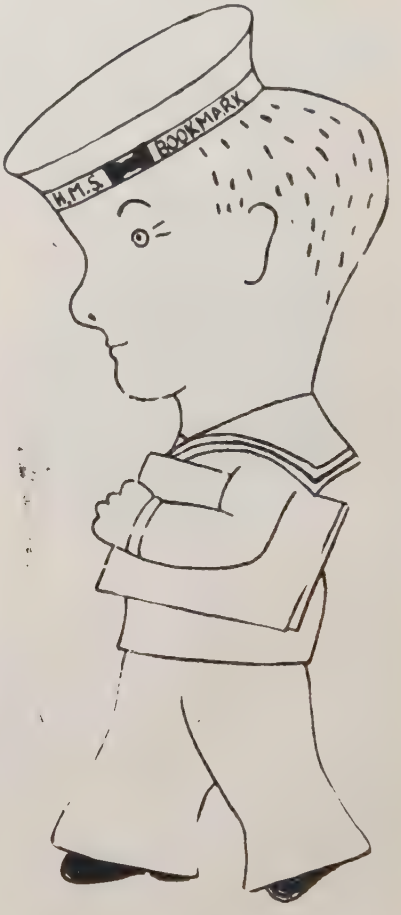
Bookmarks are favourite small gifts and are quickly made, offering plenty of scope for originality in choosing the shapes and colouring. No great amount of skill in drawing is needed, and several could be made on one wet afternoon by the older children. Trace any chosen outline from a magazine or book on greaseproof paper. Turn the paper and go over the outline with a soft pencil. Take a sheet of fairly stiff drawing paper or piece of light card, place the tracing over it, and with a sharp, hard pencil or point of knitting needle trace the first outline again. Paint with water colours and then outline again with pen and ink, taking care that the paint is quite dry or the ink will spread. Two outline figures are given, but these are only a jumping-off place for your own imagination. Children's picture-book figures, comic strip personalities, and animal drawings are other suggestions. Pierce a hole at one end and make a loop of strands of embroidery cotton or wool in matching colours.



An attractive pattern for a bookmark.

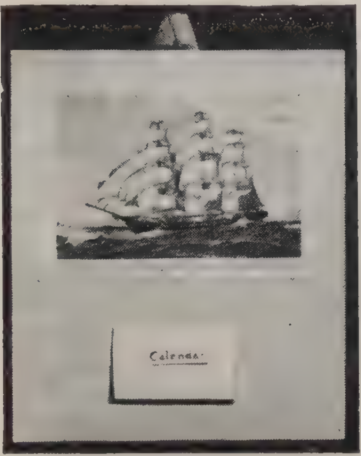
ATTRACTIVE BOOKMARKS

Upper—Magazines will yield pictures for calendars. Middle—Spread paste thinly and press out any wrinkles. Lower—Trim the edges with a knife guided by a firm straight edge.



Calendars

Calendars are not so plentiful now that many storekeepers have been unable to send them to convey the compliments of the season to their customers, and stationers' shops carry fewer and much more expensive stocks. Try making one or two at home for gifts; it will not be difficult and you may be able to give them a personal touch that will be pleasing. Search through your old magazines and Christmas cards to find illustrations—flower pictures, landscapes, child and animal studies are all suitable. Choose bold, bright colours if possible, as they give the greatest effect. Trim off any unwanted margins or lettering with a sharp knife or razor blade guided along a firm straight edge; a cleaner cut can be made this way than by using scissors. Find a good piece of cardboard in cream or white; the backs of writing pads will be useful, but may be soiled. In this case paste a piece of light-coloured, unpatterned wallpaper over back and front. Place a large book as a weight on top of the covered card until the adhesive is dry, but be sure to put a sheet of paper between the book and the card or the dampness from the paste may mark both. Trim the edges neatly, using the knife or blade. Try the picture on the prepared mount to find a good position, leaving enough room for a calendar below. Spread paste or gum very thinly and evenly on the back of the picture and press out any wrinkles very carefully with a clean, dry cloth. If flour-and-water paste is used, be sure no lumps are left on the picture. Stick on one of the small calendar tabs which can be bought from most stationers in various sizes. Now all that is needed is something by which to hang the card; short lengths of narrow ribbon, silk braid, plaited embroidery cotton, or even wool will be useful. Put two dabs of paste in the middle of the top edge at the back, set on the loop, and paste a strip of paper over the ends to neaten and strengthen the finished hanger.



A small piece of paper in a slightly different shade or texture from the card can be put underneath the picture for an extra mount. Lines drawn parallel to the edges of the picture in heavy pencil or ink will also add to the finished appearance of the calendar.

From Your Garden

One of the nicest presents a town dweller without a garden can have from a country friend is a collection of produce. A shallow basket filled with any combination of fruits, vegetables, and herbs which are ready in the garden can look very colourful and attractive. Good gardeners in favoured districts may have new potatoes, small red plums, peas, beans, lemons, beetroot, carrots, lettuces, radishes, mint, parsley, and thyme. Wash the roots to show off their colours and tie up in small bunches; include some of the leaves from the plum and lemon trees and use the sprigs of herbs to decorate the basket. If you have some small pots of new season's gooseberry jelly, strawberry jam, or lemon cheese, and can spare one or two, tie them up in cellophane paper of red and green, the real Christmas colours. Sprinkle the produce well with cold water to help to keep it fresh, and tie a Christmas label on the handle. Gather the vegetables in the early morning and try to have the basket delivered as soon after as possible. If the present has to go by carrier or rail, pack the stuff in a small box; a flat tomato case will be a good size. The contents will not look quite so attractive this way, of course, but they can still be nicely arranged and will be most acceptable.

GARDEN GOSSIP

FROM the prize money I won recently I'm buying some new perennial plants for my garden so that I will always have the joy of them around me. We've had some severe frosts this year, preventing my garden from making good headway. But the nemesias are coming out, and the bulbs are nodding golden heads to please me, while the roses, after looking very sad, have now recovered and are sending forth vigorous shoots. During the school holidays I had two beautiful bunches of flowers given me. Such gifts always give a garden lover a thrill. The house has looked so bright with all the vases filled again. I think the gift of flowers is a lovely idea at any time.—**"Tiggetty Boo," Kati Kati.**

"TIGGETTY Boo's" article on a new garden struck a sympathetic chord. I, too, am making a garden, in spite of many gloomy forebodings from "along the road." Last year I had three beds of flowers blooming for months. This year my hopes are high, for I have just received a huge parcel of seeds from overseas. I slipped out today to put some in seed boxes. What fun it will be watching them grow—forget-me-nots from South Africa, candytuft from England, and cosmos, asters, heliotrope, and lavender from U.S.A. I also have daffodils from New Plymouth and anemones from Timaru. Yes, Mary, there is nothing so satisfying as a garden shared by friends.—**"Kitty-cat," Palmerston, Otago.**

LIKE you, "Tiggetty Boo," I've just recently moved from my old home to a new one. I hated to uproot my garden. After five years of collecting I had a nice perennial border. Now I have to start all over again. Not even a tiny patch of soil has been turned over here in years, but I did find one shrub growing in the long grass—a cotoneaster. Its masses of scarlet berries are a delight to the eye. The poppies I planted are in bud and the orchard is dotted with clumps of dainty snowdrops. They will fill the vases until the sweet peas, Canterbury bells, antirrhinums, and pansies are ready. I've lots of good dahlias to plant, too, so my garden, like yours, "Tiggetty Boo," will soon be a place of beauty, and the knowledge that all I do is for our own farm spurs me on to greater efforts.—**"Green Acres," Whangarei.**

GARDEN LORE.

If hydrangeas are placed in very hot water, instead of cold, the lovely blooms will last for over a week. This also applies to the lemon-scented verbena which droops so soon in cold water.—*Garden Lover, Canterbury.*

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Common Foot Troubles

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MINOR foot troubles are all too common. It's a curious fact that, while most of us will take every care of our hands and our faces, we seem to forget all about the feet. Yet the foot is one of the most complicated parts of our anatomy, and it doesn't take much to injure that complex structure of bone, muscle, and ligament.

Foot-room Needed

Bunions, hammer toes, and that big lump on the top of so many women's insteps are really due to lack of forethought. Bunions—enlargement of big toe joints—may come from narrow-pointed shoes or from short and pointed stockings. If the big toe is bent by the shoes, and forced to overlap or underlap the second toe, the big toe joint gets partially dislocated. The joint swells and inflames, the foot is pushed out of shape, and pressure when the shoe is worn causes aches and painful feet. Prevention of this trouble is easy—a shoe that allows the big toe room to move and be free. And the freedom from compression from wrong, tight shoes allows the foot muscles and ligaments to bend and flex toes and feet and keep them healthy.

Hammer toe is a bending or pushing back of the end section of one or more of the toes, usually the second or third. The usual cause is the wearing of short and pointed shoes; the remedy—throw away the cramping footwear and buy properly-fitting shoes. Get specialist treatment to the bent toes to make them normal again.

A prominent joint on the top of the instep is common in women who have worn tight short shoes. The lump hurts when shoe eyelets or lace-up shoes press. You can't get rid of such a lump when developed. See that your daughter avoids it by selecting shoes of ample length from earliest years.

PEACE

When Peace shall spread her wings o'er
all the earth
And sorrow's night gives birth to sunlit
day,
We'll not be selfish in our joy,
But bow in silence for those bereft,
And pray
That in their hearts sweet solace shall
have place,
Since their beloved have helped to
sanctify this day.
—Emmie Nattrass.

Crooked toes result from long-continued crowding. When pressed together by the shoe or stocking—and don't forget tight socks or stockings can do as much harm as tight shoes—the nails are pressed down into the flesh, and ingrowing toenail begins to plague the owner. If the ingrowing toenail causes inflammation and ulceration, don't treat it yourself, but seek your doctor's help. Unless you want continued misery, you'll have to remove the cause. Get fitted with the right size shoe and stocking.

Shoe Friction

Corns and callouses come from the friction and pressure of wrongly-fitting shoes. The skin hardens and thickens. Gradually a mass forms, causing pressure on nerves and therefore pain. Now corns and callouses are but warning signs—advance intelligence that you've been putting up with ill-fitting footwear. If you don't heed the warning, just give local treatment to the corns, and continue wearing the wrong shoes, the pressure may go on to produce bunions and hammer toes. Relief for corns is commonly sought from salicylic acid corn cures, from the cutting or paring of them, or from shields. The cutting of corns is dangerous unless everything is sterile. Padding and shielding corns is preferable for most people for relief. But these relief measures don't cure—only roomier, better-fitting shoes do that.

Remember, most foot troubles come from ill-fitting footwear. When buying, see that your feet are always measured for arch length, width and overall length, and that the arch of the foot fits the arch of the shoe. And see that the shoe is long enough to allow toe movement, and is neither too wide nor too tight.

◆

Colour in the Kitchen

EVERYONE has favourite colour schemes for interior decoration. I wonder how many "Good Neighbours" realise the cheerfulness of red paint judiciously applied. My house has a little cream kitchenette opening on to an enclosed porch, also painted cream. Off the porch is a small laundry. I had all the doors enamelled a vivid red, and for the floor of the porch I found some old-fashioned red linoleum which takes a high degree of polish. I put a cream and red stool in the porch and made cream casement curtains bound in red to hang at the windows. For two years after my marriage I taught school, and when I arrived home at night after a hard day the sight of my cream and red porch cheered me immeasurably.

Since then I have added red-topped stools to my kitchenette furniture, and the laundry windows have cream and red curtains, and I appliqued red Scotch terriers to my peg-bag and wall-pockets. I even managed to get scarlet and fawn coconut matting for the floor, and on these frequent grey days the back portion of my house provides an antidote to the most severe fit of depression.—**"Francisca," Greymouth.**

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Mary's at - Home -

I CAME across this little piece in a magazine lately and I think many of you will enjoy it as much as I did.

"A little stone can result in a big and very painful blister. So whenever you get a stone in your shoe take your shoe off and get rid of the stone. Throw it away. And whenever a little irritation grows in your spirit do the same. Whenever some one grieves you forget about it, rid yourself of it, do not nurse it, hugging it to yourself till it wounds you deeply, spoils your nature, shadows your life, eats into your mind and heart and makes you limp along all the time.

"There are mortal enemies looking the other way in the street every time they pass each other, all because once, long ago, somebody said something hasty or unwise, or because somebody would not apologise or forget. A mother I spoke to recently would not enter a certain church in her town because her son had been insulted by its former minister 35 years ago. Imagine, limping around all that time with that little stone in her shoe."—**"Blue Bird," Taumarunui.**

THERE are bunches of bulb bloom everywhere here, and I have a glorious flowering currant, but alas, owing to the continuous cold, wet weather this season, there is a lack of bees and we do like to see them around at blossom time. There was a dance in the local hall last night and willing hands had made the bare walls charming with red and white flowers against a background of fern and greenery.—**"M.," Feilding.**

OUR plum trees are a wealth of snowy blossom just now—they remind me of a bride's bouquet. We have a river on one side of our boundary and it runs in the shape of a U round our orchard. I am sure the plum trees must have been planted by a lover of beauty, for they grow at intervals upon the riverbank and are interspersed with green weeping willows. Yesterday I walked in the orchard specially to see the blossom. The wind had spoiled quite a lot of it and the petals lay on the water like fallen stars. I've never seen anything quite so beautiful before.—**"Green Acres," Whangarei.**

I DO appreciate your "At Home," and I would like to join your happy circle. I noticed "A. M. Dowell's" paragraph saying how much she liked the "Journal" covers. I feel sure she will have been delighted, as I was, with July's cover—it is both beautiful and appropriate. "Dorothy's" comment concerning the pleasure the arrival of a letter gives made me think of a similar joy—a knock at the door. I always feel a pleasant thrill of anticipation when I hear a knock. Whoever is there I may be able to cheer them on their way with a cheerful word, a pleasant smile. Here is a thought I would pass on to you—perhaps you will remember it as you go to answer the knock on your door: "Smile awhile, and while you smile, another smiles. Soon there are miles and miles of smiles, because **you** smiled."—**"Dorothy Pearl," North Auckland.**

IT is very interesting to me, a new subscriber to the "Journal," to read the paragraphs by "Good Neighbours" and I sometimes wonder how they came upon their pen-names. I shall sign myself "Floozianna," the pet name of our young miss of 5 years. The name may sound strange, I admit, but to me it embodies all the endearment a mother can bestow on her daughter.

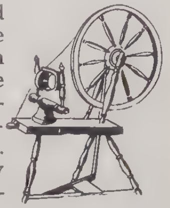
We have a farm just out of Auckland, within easy access of splendid east coast beaches, and having a glorious harbour view. In the summer, after a heavy day in the hayfield, we pile into "Gertie" (our faithful two-seater) and drive down to the beach for a swim before dark. What a satisfying occupation it is for a warm spring day just to sit in the sun and think of our blessings and give thanks!—**"Floozianna," Mairangi Bay.**

Rainbow

I watch a grey-gowned shower
Slip past. The slow sun shows,
And like a springing flower
Stormward a rainbow grows . . .
. . . Upon thee, tired storm-cloud,
I see the sun has placed
A sash to make thee proud,
A rainbow round thy waist.

I DO enjoy the arts and crafts articles, and wish I had more time for hand work. I do a little spinning, and have been dyeing some wool with lichen, which gives a fast dye. The recent article on spinning was most interesting and helpful. . . .

We have had a very wet spring and the garden is late this year. We need some warm, sunny days to dry the ground so that I can get on with the planting.—**"Effie," Murchison.**



I WOULD like to express my appreciation of your pages, which I always read from beginning to end. The verses are so appropriate, and it is so interesting to hear what our country sisters are doing.—**"Jenny," Masterton.**

ALL my life I have loved trees specially. When I was a child I talked to the trees, and they were my friends and playmates. Mine was a lonely childhood in many ways, and I often used to wander over the hills getting to know every "stick and stone." The last snowstorm caused great havoc in the gardens and plantations. Pines, wattles, and bluegums suffered chiefly, being broken and then frosted. Some of them had a rusted look. I say "had" because we have just had another terrific gale. It reached its peak at midnight—the wind was

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roaring, the sky was clouded, and the trees were lashing against one another in fury, swaying and bending at alarming degrees. Suddenly there was a sickening crash and over came one of the tallest pines, and then another. What a horrible sensation it was to stand there and watch our lovely plantation being destroyed. Before long the rain came down in torrents and that meant the cessation of the wind. The sight that met our eyes next morning was one of desolation and destruction. It will take weeks to repair the damage—fences have been lifted and broken, water races blocked, telephone lines damaged, and of course there are all the fallen trees to be attended to—a heartbreaking job. It is a sad sight to see the tangled mass of wreckage in the plantations.—**"Cloudy," Ashburton.**

OTAKI violets are in their full glory and fields of poppies make a pleasing sight. Our lawn has just been freshly cut—I love the smell of the grass. The throstles and blackbirds sing all day long from early morning until the sun goes down, and it is so pleasant in the country now with the trees looking so lovely against the blue of the sky.—**"I.J.S.," Otaki.**

YOU have included some beautiful gems of verse in our pages lately. Many are new to me. . . . I do agree with "Vista" about the lack of religious instruction among our children. We've all seen the result of a godless nation attempting to build a world without Christ and His love. When we hear of the terrible fate of the prisoners under such a regime, surely more parents will wake up to where indifference to religion leads people. While men fear today that Christianity is perishing, they are forgetting that God is its author, and no matter what happens in the world it cannot perish with Christ at its head.—**"Tiggetty Boo," Kati Kati.**

I LIKE your choice of subjects for competitions—they're intriguing! I've been very interested lately in a catalogue containing lists of original manuscripts—some by New Zealand authors—also names of first editions by famous authors.—**"Sara E.," Otago Central.**

Evening

She sweeps with many-coloured brooms,
And leaves the shreds behind;
Oh, housewife in the evening west,
Come back, and dust the pond!

You dropped a purple ravelling in,
You dropped an amber thread,
And now you've littered all the east
With duds of emerald.

And still she plies her spotted broom,
And still the aprons fly,
Till brooms fade softly into stars—
And then I come away.
—Emily Dickinson.

WHAT a lot of good reading in the August "Journal"! I love all the poetry, and I'm always collecting bits for my scrap book. I like your idea of a holiday at home. One of the nicest holidays I ever had was when the family were all away for a week once. I gardened every day and didn't worry about cooking, or the house, till the last day. I used to have tea by the fire at night and read until bedtime. I just loved the peace and quietness, and doing the things I wanted to do.

MY garden is very nice just now—bulbs everywhere, and the shrubs are lovely, especially the flowering peaches and *Viburnum Burkwoodii*, the latter having a wonderful perfume.—**"Vista," Ohaupo.**

RECENTLY a "Good Neighbour" left our district. I miss her so much that the feeling of loss becomes at times a big ache. What made us good neighbours? Help in sorrow and sickness; joy in each other's pleasure; cheery chats; sharing many things; knowing that in any emergency, small or large, we could call on each other for help.—**"Haruru," Kaukapakapa.**

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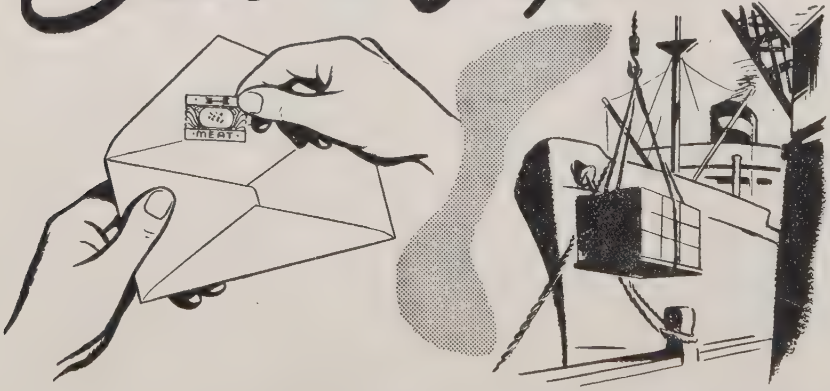

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Issued for the Food and Rationing Controller by the Economic Information Service

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"A FRIEND in need is a friend indeed." When one of our children was taken ill and had to go to hospital our neighbour requested us to leave our two sons with her while we set off for town. On the way home our car broke down and another neighbour brought us home the last few miles in his car. We arrived after dark and were very pleased to find our cows milked, the animals fed, and wood in to start the fire. This had all been done by our neighbour's husband, with the help of one of our boys. When my husband went to collect the boys they had had tea and were washed ready for bed. I think that acts like these constitute true neighbourliness.—**"A.E.T.," Mangapai.**

Words

There are lovely words—
One is Desolate:
It dresses tired sorrows
In a purple state;
It fastens a gold mask
Over loneliness;
It lies like a rich veil
Over prone distress.

There are lovely words—
One is Merciful:
It is like brown water
Dripping slow and cool;
It is like a cold hand
Pressed on burning eyes;
It is like slow music
Before the flute dies.

There are lovely words—
One is Dream:
It is like the moon-line
Laid on a black stream.
It is like three tiny sails
Along an orchid sky;
It is all silver things
That will not die. . . .

Words are like red butterflies
Over the wheat yield:
Words are like thick snow
On a scarred field;
Words are sweet to say
Softly under breath . . .
There are lovely words:
One is Death.

I HAVE rather an uncommon motto hanging in my room. It was given to me when I was a child, but I did not really understand its true significance for a long time. "Don't wait for your ship to come in—row out and meet it." What a good way to face life, not just taking each day as it comes, but looking into the future and planning for the happiness and well-being of one's family, and others. Especially in this period of post-war reconstruction we must play our part to the best of our ability.—**"Carreen Michael," Auckland.**

IN the July issue "Meg" suggested letting children's little treasures be collected as the nucleus of a museum, and I think this is an excellent idea; it is so sad to see their little bits and pieces swept into the dustpan in order to "keep things tidy." I remember reading that an eminent surgeon once said that he would rather see a child have a bowl of creatures on the drawing-room carpet than have no hobby at all. Another pleasing scheme is to build up a family history, not only by collecting every printed notice, but by letting the children write short accounts of special happenings, or of favourite pets, and paste them in the book with photographs where possible; it is great fun in later years to read these pages, and as the family grows older the scheme can be more ambitious and type can replace pen and ink.—**"Lincoln," Dannevirke.**

YESTERDAY a friend popped in with an unexpected and delightful gift—a large bunch of fresh daffodils. My sister and I promptly marshalled vases and jugs together and became absorbed in arranging these lovely flowers. When we had given rein to our slight artistic ability in the matter of floral decoration the house sported a gay, joyous air, as a dark hall and many odd corners were brightened with a "host of golden daffodils." The kitchen window-sill was also adorned, as Heather explained that daffodils even lend glamour to dishes. We said to each other that spring was here at last, and, as if in ironic reply, a small storm suddenly lashed itself against the windows with winter fury. "Not spring exactly," laughed Heather, "but our daffs. are a promise of long, warm days to come."—**"Bry," Eltham.**

WE have been taking the "Journal" for a long time now. I did so enjoy the travel competition. I love reading, but my real hobby is gardening. One always finds comfort among the growing plants. This is a particularly busy time just now, sowing seeds and getting my garden tidy.—**"New Chum," Otautau.**

COLOUR

Cornflowers blue in a bowl by the door,
Sun slanting gold in a line on the floor.
Frilly white curtain sprigged over with green
Shading to coolness the sky's rosy sheen.
What a scene to recall in these dull city days—
To recall and splash over monotonous greys!

—M. N. Kelly.

IF we are unable to pay a visit to a friend, perhaps we can send some flowers: "The fragrance of thoughtfulness lingers after the bloom hath passed."—**"Relda," Banks Peninsula.**

RECENTLY there were two feet of snow on the ground. Unfortunately the birds suffered. We fed the little wax-eyes that flew about, even into the house. We had to feed the sheep with hay, and my father made a snow-plough to run over the turnip paddock so that the sheep could find the turnips. Later a warm nor'-wester set in, followed by a thaw. Soon the snow was all gone and the birds were singing to their hearts' content. Daffodils and crocuses are

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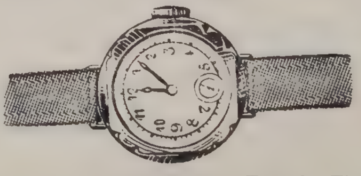

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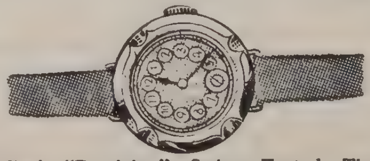

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already peeping through the ground. The pussy willow is covered with silvery buds, and outside my window the myriads of buds on the cherry plums glisten in the dew.

For now the heavenly power
Makes all things new,
And thaws the cold, and fills
The flower with dew.—Tennyson.

—**"Robin Gold," Kowai Bush.**

MOTHERS who have lunches to cut may be interested in this method of spreading the butter ration. Cut up the butter and place it in a basin, pouring a small amount of hot water over the butter (approximately 1 tablespoon hot water to 1oz. butter).

The evening river is level and motionless—
The spring colours just open to their full.
Suddenly a wave carries the moon away
And the tidal water comes with its freight of stars.

—The Emperor Yang-ti (Seventh century).

Work the water through the butter with a knife. When the butter is soft pour off the water. The butter is then easy to spread and goes much further.—**"J.E.S.," Kerikeri.**

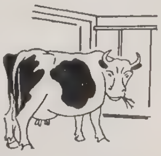
WHAT an exhilarating feeling one has on awakening to see the sun shining through the window and know that we have left the cold, bleak months of winter behind us. It is great to get breakfast over, chores done, and the spade in your hand ready to do a day's work in the garden.—**"We Four," Papatoetoe.**

The glory of the spring how sweet!
The new-born life how glad!
What joy the happy earth to greet,
In new, bright raiment clad!

One could kneel in thanks for the wondrous beauty of spring, the fragile strength of flowers blooming so bravely after many months of frost and snow. What lessons they teach of patient endurance and courage in adversity.—**"Janet," Manawatu.**

What's in a Name?

I WONDER if any of the members of the "Good Neighbour" circle possess a herd of cows with such strange and fancy names as ours. There are Apples, Vanilla, Freckles, and Candy, just to begin with, and I christened three others Snowdrift, Silvertips, and Delicious. This last was considered so unsuitable by the male members of the family that the animal was given the plain, sensible name of Bonnie.



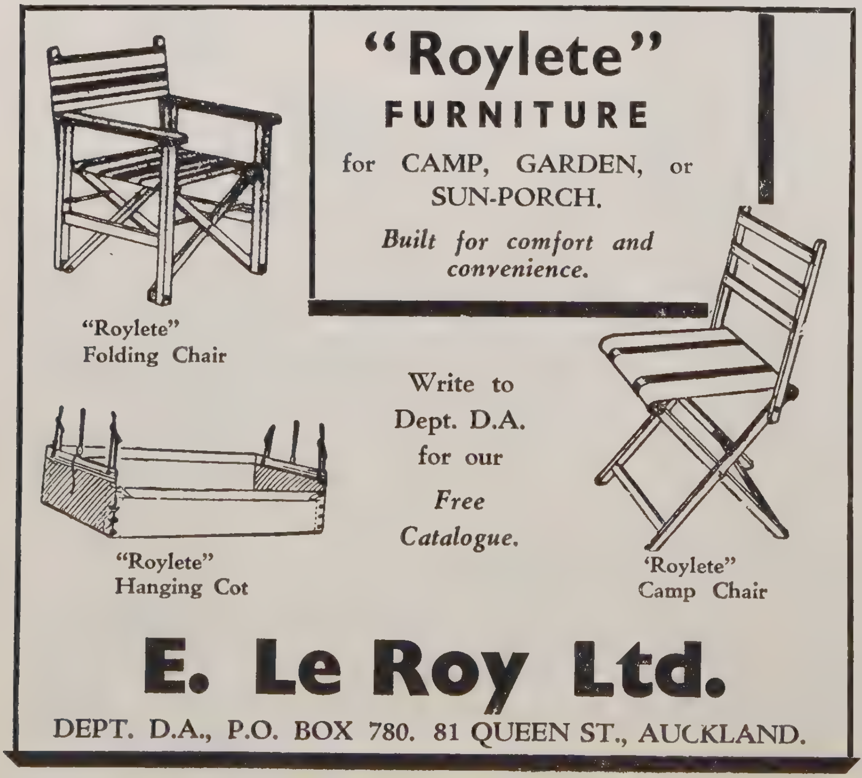
Dad, not to be outdone, decided to call his three best cows Wager Gladys, Beaux Combination, and Hollyoak Annie, saying that they were the names of world champions. However, they are now regarded as our worst cows. You would think by this time that we would have had enough of fancy titles, but no, there are still Lucky, Happy, Dainty, and Red Ochre. How fortunate that cows cannot talk. I am beginning to think that the saying, "What's in a name?" has some sense in it!—**"Dorothy Pearl," North Auckland.**

Australian Correspondent

"MY brother, overseas with the A.I.F., became friendly with some Kiwis who shared his interest in the land and things agricultural. All the boys have now returned to civil life, and brother's friend forwards his copy of the 'Journal,' which is enjoyed by the whole family. I'd like to say how much I enjoy the beautiful little poems. I've copied quite a few and sent them to friends. Secondly, I'd like to see some of your New Zealand gardens. You all seem to be garden lovers—I spend most of my spare time in ours, but I'm afraid my results would not compare with 'Tiggetty Boo's,' for instance. Being an office worker and having my brother's dogs to look after (he is at present in Central Australia), a pony to exercise, and a Sunday School class to teach, I find the days very full.

"The Great Western district is a pretty one, surrounded by hills and with the beautiful Grampian Mountains just 26 miles distant by road. I mustn't start talking scenery to New Zealand folk! You certainly have your share of mountains and views, and as it is my ambition to travel some day, I certainly hope to see Mount Ngauruhoe, Milford Sound, and the geysers and lakes. Do you think one of your readers would like to write to me? I'm fond of books, music, gardening and outdoor life, just like the members of your happy circle. I'd like to have a correspondent in your interesting country. There is a Victorian publication, 'Wild Life,' dealing with birds and wild flowers, which I should be pleased to pass on to someone interested. You may have a naturalist among your many friends who would care for it.

—*"ALISON HENDERSON,*
"Great Western, Victoria,
"Australia."



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"In What Way Would You Improve Rural Living?"

THE subject of this month's competition was one on which "Good Neighbours" apparently hold decided views. Though there was general agreement on major improvements, and very serious and constructive thought was obviously given to most entries, individual competitors' conceptions of their rural Utopias were so wide and varied that I decided that the wisdom of Solomon would be needed to evolve conditions in the country to suit all countrywomen.

Rather envying Solomon, I awarded first prize of 10s. to "Effie," Murchison, and second prize of 5s. to "Far North," Kaitaia, with "Late Comer," Feilding, and "Lottie," Palmerston North, highly commended.

First Prize

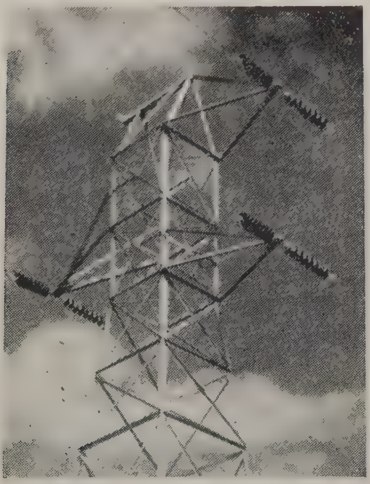
THIS big subject needs looking at from several angles.

Human beings are composed of body, mind, and spirit, so we can place any suggestions under three headings: 1. Education. 2. Physical training. 3. Religion. Each bears on the other, and one cannot be developed at the expense of the others without detriment to both individual and community.

For education the centralised school is the best for rural districts, for several reasons, some of which are as follows:—

1. More competition in the classes, giving a greater impetus for study.
2. Better facilities for organised games.
3. Greater opportunities for forming congenial friendships.

For the young people and adults a healthy community centre run by a carefully-selected leader and helpers would provide both educational, cultural, and physical training. Classes for all kinds of handicraft, physical training, and literature could be part of the programme, with social and musical gatherings too.



"Power for every rural home."

A good circulating library is another essential, and the Country Library Service would fill this need. It has a special branch, too, for isolated readers.

Electric power should be available to every rural home at a cost equivalent to the town charges, and any scheme to bring this about should have full support.

Good roads make for easier travelling and give country folk a better opportunity of meeting together for social and other gatherings and also facilitate the disposal of produce, keeping down the cost of upkeep to vehicles and damage to goods. There should be plenty of machinery available soon for the construction of good roads.

The religious side, which will naturally have an influence on both the others, is a more difficult question, but one idea would be to have an inter-denominational church or centre supported by all the churches supplied by ministers or lay preachers from all denominations. Christianity is fundamentally undenominational, but at present only one or two sections are provided for in any rural district. If this united centre could be developed, there would arise a spirit of comradeship that could not fail to lift and improve the life of any rural community.—**"Effie," Murchison.**

Second Prize

Janet and John discuss Improvement of Rural Conditions.

John: Here's an interesting book, Janet, "Improvement of Rural Living."

Jan: What does it offer?

John: Oh, better transport, better housing, electricity and electrical appliances for all.

Jan: Mm—they all involve heavy capital outlay. These things won't necessarily make people happier, nor will they enrich their lives as individuals.

John: True. What would you suggest?

Jan: Well, our Women's Institutes and the W.D.F.U. do a grand job, encouraging women to meet together to discuss and plan solutions for their problems, to take up hobbies, and to learn new crafts.

John: You mean the women find self-expression this way. What of the men? How are you to improve conditions for them?

Jan: Radio does much, I think—talks to farmers, reviews, Parliamentary debates—all these help them to keep in touch. A better mail service could be provided in some districts, as the country folk depend so much on papers, journals, and mail as contacts.

John: I agree, but do they not lose a great deal culturally through non-access to libraries, films, and so on?

Jan: No, I don't think so. The Country Library Service is available to everyone, groups or individuals, and it offers a first-class selection of material. The W.E.A., too, has its own library; groups all over the country get plays, novels, or other matter to use with or without lectures.

John: Have you seen any of these, Janet?

Jan: Oh yes, I've taken several study courses. There's always been keen interest among our local people, young and old alike.

John: You think, then, that the further development of all these will improve conditions of rural life?

Jan: Undoubtedly.

John: Well, what of people like me, for instance, who like to be amused after the day's work? What can your rural district offer me?

Jan: John, dear, come back with me. I'll guarantee you an evening's fun at our Social Club.

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REGULATE YOUR CHILD'S NIGHT LIFE

In our last message SLEEP was underlined as one of the three requirements for sturdy childhood (the other two were a balanced diet and fresh air). Sleep is just as necessary for *mental health* and *nervous stability*.

Sitting up late at nights, too much evening entertainment, picture shows, and so on cut heavily into the child's natural period of rest. The result: overstimulation, nervousness, irritability, dullness—instead of the sparkling eyes, mental alertness, and abundant energy of healthy youth.

OVER-INDULGENT AND CARELESS PARENTS ARE TO BLAME for easily upset and highly strung children.

This schedule of sleep is suggested as necessary:

Under five years of age . .	12	hours sleep
From 6-11 years of age . .	11	„ „
„ 12-14 „ „ „ . .	10	„ „
„ 14-17 „ „ „	9½-10	„ „

SEE THAT YOUR CHILD GETS *RESTFUL* SLEEP

5b KEEP THIS ANNOUNCEMENT FOR FUTURE REFERENCE

FOR A HEALTHIER NATION

John: No thanks! I'm too old for dancing.

Jan: I said Social Club, John. Young or old, all congregate on Saturday evening and we offer something for all. In one room table tennis, darts, or quoits are played; in another table games such as chess, draughts, or Chinese checkers occupy small groups. On the reading desk are displayed current copies of various papers, magazines, or weeklies, all of which are widely read, or at least well thumbed.

John: **Must** everyone do something?

Jan: No, one does what one likes. Most participate in some activity, but some prefer to chat with their neighbours, or to discuss topical questions. Co-operation towards self-expression is what we want.

John: What of group expression? Isn't that equally satisfying?

Jan: I am coming to that. After a light supper we all join in singing, action songs or dances, play-reading, or games. Following this is a general discussion of local matters and everyone goes home **mentally** refreshed, if physically tired.

John: But, Janet, I'm afraid your club depends too much on the initiative of one person. You suggest clubs like this everywhere, but who will run them?

Jan: Oh, John, they run themselves; everyone participates. It is the community effort to improve conditions for all. This is the essence of living—co-operation by all.

John: You think, then, that the ideas in my book here are not vital?

Jan: They're not. Ultimately all these things will come. But for **all** people, whether town or country, real satisfaction and happiness depend not on material things but on spiritual things—that is, the attempt of the individual to approach, though never attaining, the ideal of oneness with the Highest.—**"Far North," Kaitaia.**

Highly Commended

CLOSER settlement would help to solve many problems involved in improving rural living. It would mean more children for the schools and thus better teaching in a two- or three-teacher school, and better sports opportunity; also more and closer neighbours for parents, and a more active and satisfactory community life. With the thousands of returned men demanding good farm land, closer settlement is inevitable. There must be a rural housing scheme to rebuild the villages. To attract people to the villages better recreational and cultural amenities must be available. To give leisure to enjoy these amenities labour-saving devices both for the farm and the home must be cheaper. Also trained help must be available for the over-worked farmer and his wife. To avoid the "living-in" problem, hostels could be provided in the village, one for domestic help and one for farm helpers. With modern transport these helpers could work on the farms and still have a normal leisure time for their private lives. This scheme would bring young life into the country and relieve the farmer and his wife of the drudgery which is the curse of rural life.

COMPETITIONS

DECEMBER

Send in your entries early for the "Strange Coincidences" competition. The closing date is December 15.

JANUARY

So many of you have written to me about your gardens that I feel I know them almost as well as my own flower-beds. Indeed, I never see dahlias or polyanthus or lilies without thinking of certain "Good Neighbours" who specialise in growing these beautiful blooms. I wonder which flower *you* like best out of all the different varieties growing in your gardens. Give the reasons for your choice. Entries close on January 15.

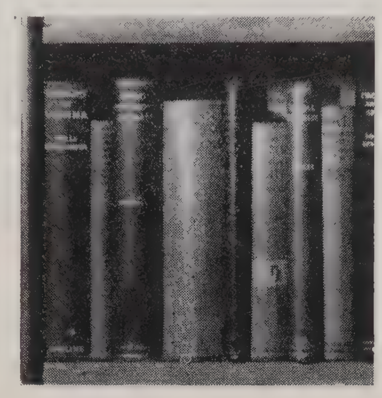
"MY FAVOURITE FLOWER"
First prize, 10/-. Second prize, 5/-.

"MARY,"
"Journal of Agriculture,"
Box 3004, Wellington.

To provide for proper use of the increased leisure I would propose transforming the barrack-like village hall into a small community centre, including assembly hall with stage, dancing floor and dressing rooms, comfortably-furnished room for meetings, a smaller room to house the Country Library Service, and properly-equipped kitchen and servery. Outside should be tennis courts and croquet lawn and a swimming bath at the school. This scheme would provide closer settlement, improved schooling, more leisure, and the means to spend that leisure in a worthwhile manner.—**"Late Comer," Feilding.**

Highly Commended

I WOULD pull down existing schools and in their stead I would erect a modern group of buildings comprising school, hall, library, gymnasium, small meeting rooms (2), rest room, and fully-equipped kitchen and dining room where hot meals for the school children could be prepared and eaten.



"Books for school and community."

The library would be well equipped to serve school and community needs with reference books as well as the Country Library Service. The grounds would contain all sports facilities, which would be available for public use, a large orchard and vegetable garden, where food for the children's dinners could be grown by the children. Any spare fruit could be bottled for winter. In charge of the kitchen and rest rooms I would put Studholme House trainees, who would give the senior girls daily practice in domestic arts, thus raising the standard of work.

The gymnasium, library, meeting rooms, hall, and sports would thus cater for all the community, whatever their tastes.

True, to enjoy this fully transport would have to be stepped up, cars, tyres, and petrol reduced in price, and all roads made passable under average conditions; houses would have to be modernised, domestic conveniences deemed essentials, and reduced in price to suit the average pocket; trained domestics with the status of a profession would assist in families of more than two children in sickness, or to give country mothers a holiday. The trainee in charge of the cooking school would act as their supervisor.

Thus we would all retain our freedom of thought, speech, and action, and gain a little leisure to enjoy true companionship with our children and friends.—**"Lottie," Palmerston North.**

I FEEL that the first step towards improving rural living is to ensure the farmer getting a price for his proproduce which is commensurate with the labour entailed and expenditure incurred in its production. Money may be the root of all evil, but it certainly opens the way to a very pleasant standard of living. Farmers work hard, and it is pitiful to see their style cramped because the prices they receive do not allow them to offer attractive conditions to workers.

When the money side improved I would like:

1. To install electricity in every home and provide reasonably-priced labour-saving devices.

2. A service of occasional helpers organised whereby it would be possible for country folk to engage a reliable person to look after the household for an evening or to help in the house at busy times. The majority of farm houses are not built to accommodate a permanent domestic, and conditions are not comfortable for either employer or employee, but it would be a boon to be able to have assistance occasionally. (In England there is a scheme of this sort in

BOOKS FOR PARENTS

THE NURSERY YEARS, by Susan Isaacs, 3/7 posted.—In this study of the mind from birth to six years, Dr. Isaacs has given simple explanations of the needs and behaviour of the child. The advice is practical, and parents will find the answer to many problems as well as a general guide to the welfare of their children.

BEYOND THE SCHOOL GATES, by K. O'Halloran, 3/11 posted.—This outstanding contribution to vocational guidance is written for parents and also for the child of twelve or over. The whole range of jobs possible under New Zealand conditions is clearly and fully described.

PLAY AND TOYS IN NURSERY YEARS, by B. Tudor-Hart, 6/1 posted.—Practical advice about how and why little children play and the kind of materials they need. Excellent suggestions are included on how to use scrap materials such as cotton reels for toys.

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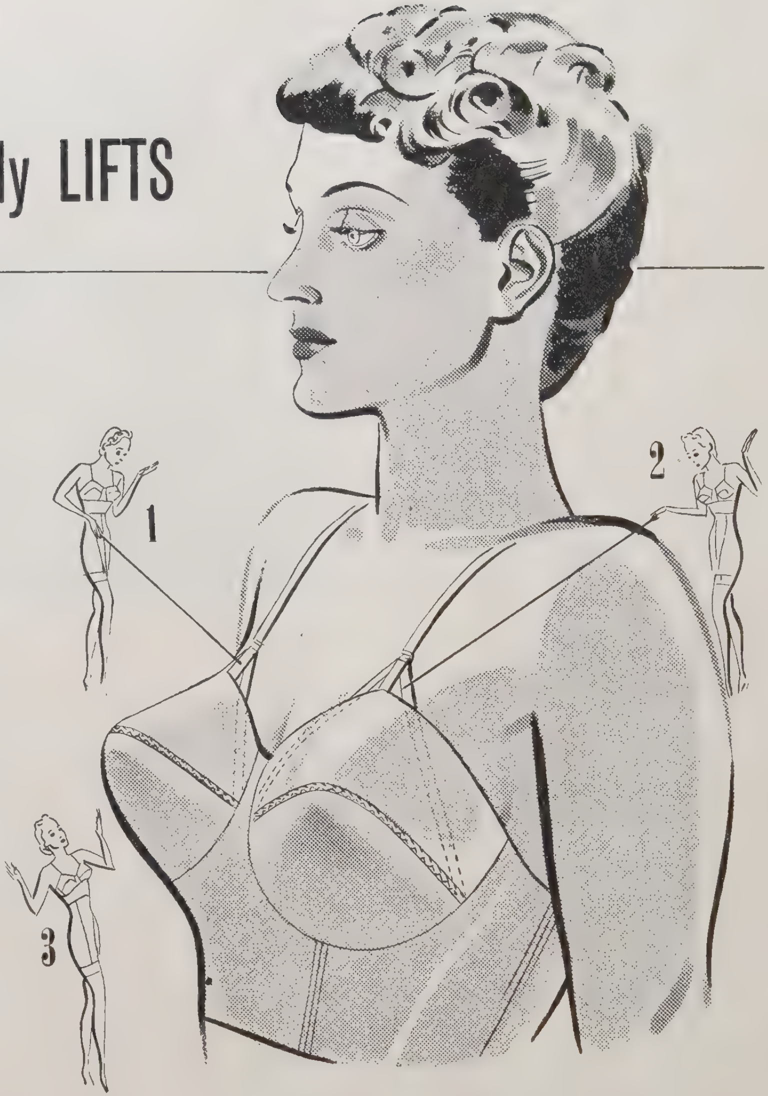

1. *Points to the elastic that gives the ease.*
2. *Points to the ribbons that brace. (Dotted lines show where they pass beneath the bra.)*
3. *Admires what is, in effect, an uplift from beneath.*

Berlei
WONDER-LIFT REGD
BRASSIERES

operation: the girls live and are trained in hostels and go out to work in pairs. They have communal life, and this overcomes the difficulty of the lonely domestic. Perhaps these training centres could be made homes for the aged).

3. I would set up a suitable creche in every country town so that small children could be cared for while their mothers did the shopping. A countrywoman's day in town is a nightmare when she has to trail round with a baby in her arms and two or three small children trudging after her, but they can't be left at home alone.

4. In every country district there should be playing facilities for young and old, a central meeting place for summer and winter games, with a large hall for social gatherings. Country children miss so much fun in life because their home duties and the absence of proper playing areas prevent them from having their share of games. They not only miss the fun which such games give, but they grow up with an inferiority complex which hampers them in later life.

"Their share of games."
[*Internal Affairs photo.*

Life in the country is very healthy, but it could be much happier if a little thought were given to the improvement of living conditions.—**"Lincoln," Dannevirke.**

AFTER 30 odd years in the backblocks of New Zealand I say, if we want to improve rural living and the outlook for the future of the inhabitants, open up the country primary schools again as a start, and allow country children to enjoy country life—have a horse and a dog of their own, and a will to battle with the elements. These 12-mile bus trips night and morning are no good to young children, and the supervising of correspondence school lessons is just an added strain on the already extra busy mothers, who either leave the farm or send the children away for five or six years.

Now, what is country life if we cannot have our children around us, at least until they must go to secondary school? If we are to have farmers for tomorrow's needs, we must plant and nurture our seedlings where we hope they will grow and flourish.—**"Pioneer," Kaikohe.**

"Farmers for tomorrow."
[*Internal Affairs photo.*

AS the farm home is the background of rural life, and farm activities radiate from it, my first aim would be a comfortable, convenient home set in sheltered, attractive surroundings of orchard, garden, and lawns. A plentiful hot and cold water system, built-in fittings, carpets on sitting room, bedroom, and hall floors, a vacuum cleaner and a refrigerator are my choice of labour-saving devices which would make a home convenient.

Next, I would advocate good farm buildings and modern machinery, as labour and time saved outside are equally as important as inside.

The much-discussed problem of domestic help would be partially solved by these improvements, as a healthy woman with an average-sized family would be able to do her own work.

However, a scheme whereby domestic help could be obtained in cases where there is a large family, sickness, where the mother has to work outside, and at busy times is most essential. Provision of comfortable, adequate living accommodation is necessary to entice labourers to rural work.

The services of a travelling dressmaker would be greatly appreciated by those country women who have neither time nor talent to sew for themselves and their children.

Lastly, I think it would be admirable if some unselfish people would undertake to mind families of small children to let the parents have an occasional evening out together. A small charge could be levied, and funds donated to a local cause.—**"Blossom Time," Southland.**

MOBILE canteens could provide hot lunches for country children, taking in two schools a day two days a week. Then on those days we needn't rush in from milking to cook their vegetables and we could put them to bed earlier.

"Hot lunches for country children."
[*Internal Affairs photo.*

Another bugbear is washing. I'd like to foist all the milking clothes on to the dairy companies—what an outcry! We could have visits, say once in three months, from mobile cleaning units run by women arriving like the shearers.

There should be mobile film vans to show the smaller films in our country halls at a time suitable to dairy farmers, say 11.30 a.m.

The indispensable gumboot and the eternal bedroom slipper do not completely fill the bill. I would like specially-thought-out footwear for farmers and their wives.—**"Midge," Waipu.**

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CARROTS

BUTTER rationing has made it necessary for us to turn to other foods containing vitamin A in order that our diet is not deficient in this vitamin which is so essential to skin health, good sight, and general vigour. Carrots are a particularly rich source of vitamin A (it is also present in greens, citrus fruits, cheese, and egg yolk) and they deserve a prominent place on the menu. But you do not need to serve them as a boiled vegetable until they become monotonous. They can be roasted with the joint, or in a small quantity of bacon fat. They can be cooked in syrup and thickened with tomato pulp; they can be steamed and served with cheese sauce, parsley sauce, or onion sauce; they can be grated and fried (the quickest way to cook them); they can be made into croquettes or escalloped with layers of white sauce and breadcrumbs; they can be used in puddings, both sweet and savoury.

Carrots combine well with other vegetables in soups and casseroles. Carrot tops should not be thrown away, but added to the stock-pot, as they contain a high percentage of mineral salts. Shredded raw carrot is not only delicious in salads, but makes a good partner for honey, grated apple, or chopped walnuts between slices of wholemeal bread. Another tasty sandwich filling comprises equal quantities of grated carrot and cheese, mashed potato and seasoning, mixed together with mayonnaise.

If you have a sweet tooth, you will enjoy glazed carrots and carrot cake. Vary your usual marmalade recipe by adding carrots to the list of ingredients—2lb. carrots to each lemon and orange. Cook till soft and to each cup of pulp allow ⅔ cup of sugar, then continue boiling till thick. Test before bottling.

CARROT PUREE

2 large carrots, 1 pint milk, seasoning, water, arrowroot.

Wash the carrots and grate them. Cook for 30 minutes in enough water to cover them. Press through a sieve, add the milk and ½ cup more water. Season to taste, bring the puree to boiling point, and thicken slightly with a little arrowroot mixed to a smooth paste with milk. Serve hot with snippets of toast.

CARROT STEW

1 bunch of carrots, 1 onion, 2 turnips, 1 apple, celery, 2oz. sultanas, dripping, vegetable stock, mint, 1½ tablespoons sago, salt, and pepper.

Chop the onion finely and brown in dripping. Wash the carrots and celery and cut into thin strips, and grate the turnips. Place in a casserole or stewpan, together with the onion, seasoning, sultanas, and sago, and cover with vegetable stock or water. Bring to the boil and simmer for 30 minutes. Add the diced apple and simmer for another 30 minutes. Sprinkle with finely chopped mint before serving.

CARROT PUDDING (SAVOURY)

½lb. carrots, ½lb. potatoes, ½lb. minced meat, 1 onion, 1 egg, nutmeg, salt and pepper, parsley.

Wash and prepare the vegetables, putting them all through the mincer. Combine with the minced meat, salt and pepper to taste, a little nutmeg and some chopped parsley, and mix well together with a beaten egg. Place in a greased basin and steam for 2½ hours. Serve with gravy.

CARROT SAVOURY

1 cup bread, 1 cup milk, 3 carrots, 1 onion or leek, 1 tablespoon suet, 2 tablespoons oatmeal, salt, 1 teaspoon dried sage, 1 egg (optional).

Heat the milk and soak the bread in it. Beat well with a wooden spoon, then add the oatmeal, grated carrot, powdered sage, finely chopped leek or onion, seasoning, and grated suet. Beat in the egg, or if the egg is omitted, a little more milk may be required for mixing. Pour into a greased flat tin and bake in a moderate oven about 1 hour.

CARROT LOAF

1 cup carrot, 1 cup beans, 1 cup breadcrumbs, 1 cup boiled rice, 1 cup tomato pulp, 1 small onion, celery,

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salt and pepper, ¼ teaspoon mustard.

Soak the beans overnight and cook till soft. Mash with a fork. To these add the carrots grated, the boiled rice, breadcrumbs, minced onion and celery, mustard, salt and pepper, and mix together with the tomato pulp. Mould into a loaf shape and bake ¾ hour.

CARROT AND DANDELION JELLY

¾ cup grated carrots, ½ cup young dandelion leaves, water, 1 tablespoon gelatine, 3 tablespoons sugar, 4 tablespoons vinegar, 1 teaspoon salt, 2 tablespoons lemon juice.

Dissolve the gelatine in 1 cup of boiling water, and stir in the sugar, vinegar, salt, and lemon juice. Leave to cool. Grate the carrot and chop the dandelion leaves, and place in a mould. Pour in the cold gelatine mixture and put in a cool place to set. Serve with salad.

GLAZED CARROTS.

4oz. sugar, 2½ tablespoons water, pinch of cream of tartar, ½oz. butter, carrots.

Dissolve the sugar in the water, add the butter and cream of tartar. Bring to the boil and boil steadily till it changes colour. When a little is dropped in water it should be brittle. Wash the carrots well and dry them (they should be about 3in. in length, otherwise trim them to this size). Place them on skewers and dip them in the toffee as soon as it is ready. Place the carrots on waxed paper to cool.

CARROT CAKE

1 cup grated carrot, lemon peel, ½ teaspoon cinnamon, ½ teaspoon nutmeg, 1½ cups flour, ½ cup raw sugar, ½ cup beef dripping, 1 teaspoon baking powder, 1 egg, ½ cup sultanas, ½ cup dates, pinch baking soda, lemon juice.

Cream the dripping with a little lemon juice and a pinch of baking soda, then beat in the sugar and egg. Add the grated carrot and beat well. Stir in the spices, chopped lemon peel, fruit, and lastly the flour sifted with the baking powder. Place in a greased cake tin and bake in a good oven for ¾ hour.

CARROT SQUARES

2 cups cooked mashed carrots, 2 cups sugar, 2 tablespoons water, 1 teaspoon ground ginger, raisins, walnuts.

Bring the sugar and water to the boil and add the cooked mashed carrots. Simmer gently till the mixture thickens. Stir in 1 small teaspoonful of ground ginger and then turn out on to a large greased plate. Sprinkle with chopped raisins and walnuts and cut into squares with a sharp knife. Leave to cool. Store in an airtight jar or tin.

STEAMED CARROT PUDDING

½lb. carrots, ¼lb. sugar, ¼lb. flour, ¼lb. beef dripping (or 2oz. butter and 2oz. lard), ¼lb. sultanas or raisins, lemon peel, 1 egg, milk, essence of lemon, ½lb. breadcrumbs.

Cream the fat with a little essence of lemon, beat in the sugar and the egg. Sift in the flour, add the breadcrumbs, sultanas and sliced peel, and lastly the grated raw carrot. Use a little milk if necessary to mix to a soft consistency. Pour into a greased basin and steam for 3 hours. Serve with hot custard.

CARROT PANCAKES

2 carrots, 1 onion, 1 potato, 1 egg, salt and pepper, 1 teaspoon baking powder, ½ cup flour, 1 cup spinach or young silver beet, fat for frying.

Sift the flour and baking powder, add the seasoning and beat in the egg. Add a little milk to the batter if it seems too thick. Chop the onion finely, grate the carrots and potato, and shred the spinach. Stir the vegetables into the batter and fry spoonfuls in hot fat. Drain well and serve hot. Fried bacon, liver or sausages make a good accompaniment to these pancakes.

Table of Contents, November, 1945.

Agricultural Education and Advisory Work in Britain—G. A. Holmes 449
Training a Sheep Dog—E. G. Broad 451
Developments in Building Materials and Their Uses—P. S. Syme 461
Short-rotation Ryegrass—L. Corkill 465
Pampas Grass 471
Radio Broadcasts 476
Grading of Export Butter and Cheese 476
Studies in Farm Management: A Pukekohe Small Holding—W. V. Hadfield 477
Pig Industry in Wartime and its Future Markets—H. M. Peirson 489
Erosion in Moutere Hills Orchards—Sir Theodore Rigg and A. J. Adamson 495
Farming in New Zealand: Imports—A. G. Rodda .. 499
Handy Type of Bee Veil—E. Smellie 509
Weed Seeds in Agricultural Seed—E. O. C. Hyde .. 510
Poultry Keeping in Bengal—G. Haddon 513
Hitch for Pulling Two Drills with One Tractor—G. K. McPherson 518
Seasonal Notes—Fields Division 521
The Orchard and Vineyard—Horticulture Division .. 527
Guide for the Home Garden—Horticulture Division .. 529
Apiary Notes—Horticulture Division 531
Poultry-keeping Section—Livestock Division 533
Young Farmers' Clubs—S. Freeman, Editor 535
"The Good Neighbour," by Mary 541

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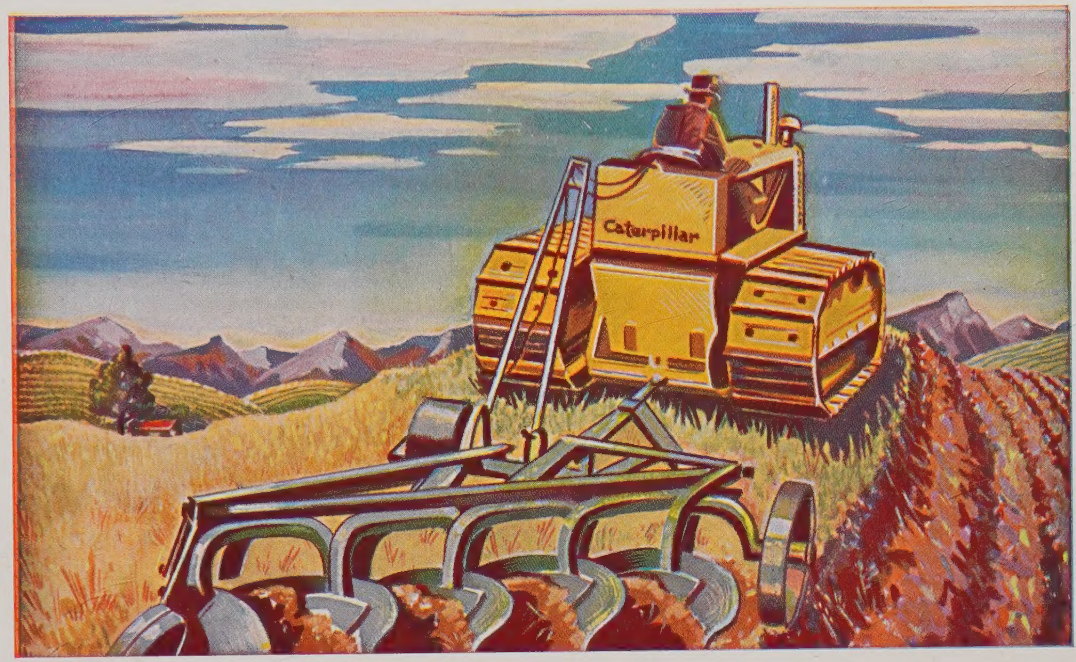

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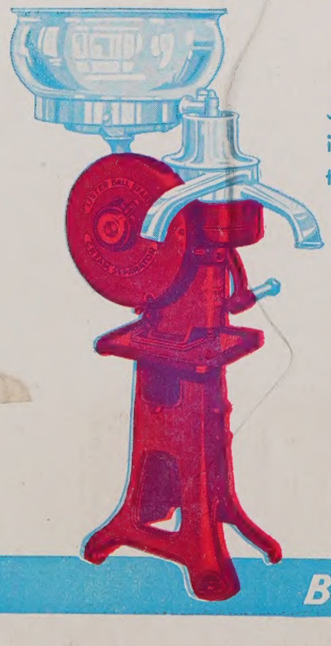

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